

Multimodal Mediation Through Picturebooks and Graphic Narratives

Educational and Translational
Contexts

Edited by Sandie Mourão and
Karen Bennett

First published 2025

ISBN: 9781032456669 (hbk)

ISBN: 9781032456690 (pbk)

ISBN: 9781003378136 (ebk)

8

Once upon a time

Gender and STEM depictions in
Portuguese children's literature

Andreia Nunes

(CC BY-NC-ND 4.0)

DOI: 10.4324/9781003378136-9

The Open Access version of this chapter was funded by ISCTE, with the support of the Fundação para a Ciência e a Tecnologia (FCT) through the funding of the R&D Unit UIDB/03126/2020.

8 Once upon a time

Gender and STEM depictions in Portuguese children's literature

Andreia Nunes

Introduction

Once upon a time stories often begin when bellies are tenderly rubbed, and the first babies' clothes and toys are lovingly tucked away. Such as literary experiences might emerge in the womb, so do gender expectations, when we start imagining distinct narratives for the soon-to-arrive girl or boy. From the age of 2 to 3 years old, children know how to label themselves and others as male or female and have learned about gender stereotyping – associating behaviours and traits according to gender – a process made easily accessible to them through the beliefs and behaviours of parents, teachers, their peers, media, and of course children's literature (Golombok & Fivush, 1994).

Children's books make an important contribution to early gender socialization at a young age where children are developing their identity, their personality (Weitzman et al., 1972), and their sense of self, both as a person, and as reader (Ramos, 2010). Reflecting cultural values from the dominant culture, stories include messages about who men and women are supposed to be and become, what power dynamics are negotiated along the gender system (McCabe et al., 2011), what gender roles and trajectories are desirable and what may or may not be challenged (Moya-Guijarro & Ventola, 2022).

Each year, on 11 February, the International Day of Women and Girls in Science is celebrated – an important day implemented by UNESCO and UN-Women in 2015 – to empower the participation of women and girls in science, technology, engineering, and mathematics (henceforth STEM), recognizing these as key areas in a fast-changing automated future. The Global Gender Gap Report of 2023¹ states that women generally tend to be underrepresented in leadership roles and especially in STEM work: They make up almost half (49.3%) of total employment across non-STEM occupations but represent just 29.2% of all STEM workers. Gender stereotypes related to STEM have an impact in children's self-concept,

educational, and career achievements, starting at a young age. Books can be great allies by presenting different role models in a variety of professions and careers (Abad & Pruden, 2013), so that children and young people place these professions in the realm of possibilities.

The primary objective of the study presented in this chapter was to conduct a comprehensive sociological, feminist, and literary analysis of gender representativity and stereotypes in STEM depictions in contemporary Portuguese children's books, having as a corpus the books recommended by the Portuguese national reading plan (*Plano Nacional de Leitura*, henceforth PNL) in the period between 2009 and 2019.² Additionally, it aimed to contribute to increasing awareness of prevalent gender stereotypes in children's literature, advocating for the importance of gender literacy and mediation.

Theoretical framework

Gender is one of the most organizing elements of our lives on a personal, social, and cultural level. It is not an expression of biology, something that we have or inherited, nor a fixed dichotomy – it is a social structure, a pattern of our social arrangements, built into our everyday interactions (Connell, 2002). Gender stereotypes are shared beliefs about the characteristics that define what it means to be a man or a woman, what physical, psychological characteristics, behaviours, relations, interests, and professions they may have and/or are most appropriate. It appears to be binary because we have been taught to see the world in this way. Indeed, these beliefs include thoughts that men and women are opposite genders, that all people of each gender are similar, failing to include the possibilities of variation, fluidity, or gender diversity. As a result, when we talk about masculinity and femininity, we associate the former with “competency, instrumentality, and activity”, and the latter with “warmth, expressiveness, and nurturance” (Basow, 1992, p. 4). Gender stereotypes have, thus, several negative consequences, affecting an individual's self-concept and impacting on mental and physical well-being (Basow, 1992). These effects are manifested as gender inequality, extending beyond individual spheres to resonate at societal and institutional levels. They permeate various domains such as education, employment, and culture, and may contribute to the persistence of gender-based violence, as well as inequality of access to spaces and infrastructures (Fernandes et al., 2023).

Attention to gender representations in children's books began with the feminist movements of the 1970s. A seminal study by Weitzman et al. (1972) revealed significant underrepresentation of women in book titles, main character roles, and illustrations, and shed light on the gender stereotyping of roles and occupations of male and female characters, often

characterized in binary and opposite terms such as “active versus passive,” “leading and rescuing” versus “following and serving others” (p. 1125). Since then, numerous studies have revealed minimal progress toward achieving gender parity in children’s literature. Male characters continue to outnumber female characters, and gender stereotypes persist, although this evolution is nonlinear, influenced by various measurement methods and methodologies, making comparisons challenging. Additionally, the impact of both feminist activism and its subsequent backlash has contributed to this complex pattern (Hamilton et al., 2006; McCabe et al., 2011; Lindsay, 2023).

Research into characters’ professions in children’s books has unveiled a trend whereby male characters are depicted in diverse occupations, displaying a range of skills and capabilities, while female characters are often confined to a more limited range of possibilities, frequently as wives and mothers, with fewer occupational options (Weitzman et al., 1972; Hamilton et al., 2006; Jackson & Gee, 2005; Nunes, 2019). This imbalance is also evident in children’s science books, which perpetuate stereotypes that undermine women’s expertise and technical skills. These books often use male pronouns when referring to certain professions, contributing to the symbolic annihilation of women, particularly in depictions related to Space (Caldwell & Wilbraham, 2018). And while recent STEM-related picturebooks depict more women than before (more than actually exist in some STEM workforces, in some cases) overall, women are still underrepresented, and these books still fall short in representing diversity and reserving a space for traditionally less represented voices. Despite some improvements, there remains considerable room for a broader representation, which will serve as a powerful influence on how children perceive their potential and their identity in STEM fields (Cardullo, 2022).

An interdisciplinary approach is considered to be the most comprehensive means of exploring the potential of verbal and visual communication, particularly how these modes interact within multimodal books (Moya-Guijarro & Ventola, 2022). Thus, my doctoral research examines aspects of gender representativity and stereotyping in contemporary Portuguese children’s literature between 2009 and 2019 from a variety of different perspectives. The analysis encompassed various coding categories, which included those associated with the classification of books by type; an examination of their paratextual elements and storyline; the characterization of characters in terms of interests, professions, psychological traits, and physical appearance; the division of household chores; types of families represented, and many others. The timeframe was selected because it reflected the emergence of small independent publishers in the Portuguese literary landscape, while also observing how children’s books mirror important societal changes. The research reported in this chapter

focuses on a small part of my doctoral study, that of exploring characters' interests, particularly those related to STEM.

Methods

Although this research is primarily situated within the sociological domain, a triangulation strategy (Denzin, 2017) of sociological, feminist, and literary perspectives was deemed the most appropriate approach for analyzing the complex subject matter of children's books. Thus, I adopted a comprehensive approach, observing narratological, textual, and linguistic elements, as well as paratextual and visual aspects, resulting in a rich dataset. Additionally, I employed a close reading technique to ensure thorough analysis.

This study incorporates feminist post-structuralist theories that deconstruct the idea of gender as innate, fixed, and stable. Instead, it considers gender as fluid, negotiated, and shaped within diverse social and cultural contexts (Jackson & Gee, 2005). My positionality is grounded in subjectivity and reflexivity, acknowledging the impact of social, historical, cultural, and political elements on the construction of knowledge, from the perspective of a white, cisgender woman. Hence, I challenge the notion of neutral scientific knowledge and instead commit to social change through the disclosure of the unevenness of power dynamics and inequalities (Neves & Nogueira, 2005). Following this premise, I align with the perspective that holds that, despite some stereotypes being positively framed (such as the belief that "girls are kind"), their failure to account for individual variation reinforces hegemonic notions of masculinity and emphasized femininity (Connell, 1987).

The literary perspective underlines the intricate capacities required for reading, including decoding signs, literal comprehension, and deep reading, which involves interpreting beyond the surface, filling in the gaps, and inferring meaning (Ramos, 2010). It is in these nuances that gendered messages are likely to be concealed, thus the importance of exploring language use, narrative messages, and character development, as well as the strategies employed by those involved in the book production (e.g. publishers, authors, and illustrators) to perpetuate or challenge gender stereotypes. In fact, gendered messages are communicated through multiple elements, commencing with the composition of book covers: the gender of the author(s) and/or illustrator(s), the gender of characters portrayed on the covers, the gender and professional titles of preface contributors, the gendered nuances highlighted in biographies, and gendered elements within the storyline and within the representation and portrayal of characters (their interests, professions, competencies, etc.). These messages, whether overt or subtle, are pervasive, highlighting the pivotal

role of books as mediators, and making necessary an additional layer of mediation through the reader – particularly in the case of picturebooks which cater to a dual audience (Nikolajeva & Scott, 2006), leveraging these shared read-aloud moments as catalysts for meaningful conversations and reflective engagement.

Taking this into consideration, I structured my study around two thematic axes: Gender representativity and stereotypes, examining textual, paratextual, and visual elements (Nikolajeva & Scott, 2006), while also exploring their convergence and interaction in shaping multimodal entities, particularly attentive of their gender provisions (Moya-Guijarro & Ventola, 2022).

To define my sample, I focused on books recommended by the PNL, targeting those for younger ages. There has long been an emphasis on award-winning or recommended books in gender research within children's literature, on the grounds that awards and distinctions serve to legitimize books, which means that they carry an added responsibility, not just in terms of literary and aesthetic excellence, but also in the quality of the messages they convey – which should embody values of tolerance, respect, and inclusion. The PNL is a public policy initiative established in 2006 with the objective of fostering reading habits among children from an early age. Each year, and since 2018, every six months, a panel of experts in children's and young adult literature carefully selects a list of recommended books. Inclusion in this list often merits a distinctive “stamp” on the book cover, which is recognized by the literary community, including authors and illustrators, publishers, booksellers, and editors, as well as families, schools, other mediators, and the public at large (Nunes, 2019).

Consulting the PNL website, I accessed the recommended lists and selected children's books targeting 6- to 8-year-olds, ensuring they were first editions within the specified timeframe, and originally authored in Portuguese. Incorporating additional criteria such as the requirement for the books to be fictional, I curated a corpus of 118 books, both illustrated books and picturebooks.³ Consequently, rather than emphasizing written language as the primary means, I drew inspiration from multimodal approaches, which highlight the equally significant contributions made by all semiotic modes in constructing meaning (Moya-Guijarro & Ventola, 2022; Serafini & Reid, 2023).

Following the selection process, data from each book was systematically recorded using an observational coding grid specially designed for this task, informed by my prior research (Nunes, 2019) and the work of Hamilton et al., (2006). The coding grid was structured into several categories, corresponding to different aspects of the book: Its theme,

storyline, and specific observations about its characters, both main and secondary. In addition to the comprehensive book analysis carried out using the coding grid and SPSS software, there was room to accommodate unforeseen observations. The qualitative software Maxqda played a pivotal role in documenting crucial cues from both text and visuals, facilitating the attribution of new categories for subsequent analysis. Indeed, this was particularly relevant for STEM depictions, which proved challenging to foresee in advance, owing to the extensive corpus size and the diverse array of books under analysis. Given the multifaceted competencies required in STEM areas – such as problem-solving, critical thinking, creativity, spatial awareness, and logical skills – a spectrum of indicators emerged that could be categorized as STEM-related (e.g. “STEM-related interests/activities,” “STEM-related professions,” “STEM-related psychological traits and appearance”). These indicators could emanate from textual, paratextual or visual sources: For example, they could derive from the discourse of the narrator or the characters themselves; from visual elements like toys/games (e.g. a rocket ship or chess game), objects (e.g. telescopes or microscopes), or specific actions performed (e.g. like naming constellations), or prefaces or biographies.

Content analysis has been one of the most common ways of analyzing children’s books, but currently there has been a shift away from traditional quantitative content analyses (involving frequency counts and predefined categories) to more qualitative ones, with researchers invited to mix inductive and deductive approaches in order to better account for complex multimodal phenomena (Serafini & Reid, 2023), such as picturebooks. The content analysis utilized in this study incorporated both quantitative and qualitative aspects,⁴ a strategy aimed to surpass the traditional limitations and do justice to the complexity of literary texts. It also embraced a dialectical approach merging inductive and deductive analysis: An initial exploration identified possible stereotypes, while a second one not only sought out elements outlined in the predefined categories, but also included unanticipated elements that might prove valuable for the study (Taylor, 2003).

Given the layered complexity of the multimodal literature, a more literary approach, particularly the practice of close reading, becomes instrumental. Even within a single book, there can be shifts between stereotypical and counter-stereotypical content (Nunes, 2019), which emphasizes the importance of employing *gender reading lenses* and adopting a critical perspective. In the next section I will present some of the most interesting findings of the corpus study, and also a close reading of three books. To facilitate comprehension, I have included my own translations of the mentioned book titles and excerpts.

Findings

Gender of the main characters

Characters serve as powerful sources of inspiration for children. Through their adventures, challenges, and achievements, children get to experience being in the characters' shoes in an alternative reality, while also discovering resonances with their own lived experiences. Of the 118 books analyzed in the corpus, a significant majority—98 books (83.1%)—present a main character. Within this group, male protagonists are disproportionately represented, appearing in 65 books (66.3%), which is more than double the occurrence of female protagonists, who feature in only 28 books (28.6%). Furthermore, only a small proportion of 5 books (5.1%) portray main characters of both genders. The pronounced gender gap among the main characters echoes findings from prior research and emphasizes the enduring challenge of achieving representativeness, regardless of the passage of time.

STEM-related interests

Characters' interests and professions play a pivotal role in shaping children's personalities and establishing relatability. Their significance becomes particularly pronounced when considering gender representativity and stereotypes as they can either reinforce or challenge societal norms, perpetuating, or counteracting prevalent gender-related assumptions. Out of the 118 surveyed books, a significant majority (109 books, corresponding to 92.4%) included information about characters' interests. The overall distribution of interests across various categories showed notable gender variation in both quantity and diversity, with male characters associated with 475 entries compared to 275 entries for female characters.

In terms of STEM-related interests, a total of 57 entries were discovered for male characters. These included a fascination with space exploration (16 entries); mathematical and engineering skills, including activities involving counting, strategic thinking, and toys that stimulate special or logical thinking (16 entries); science-related pursuits such as attending conferences, research into animals, plants, and environmental topics (15 entries); and technological engagement, involving the use of cell phones, computers, and machine invention (8 entries). Additionally, there were examples that span more than one of these areas (2 entries). On the other hand, only 34 entries depicting STEM-related interests were associated with female characters. Among these the most prevalent were those pertaining to science interests, notably environmental and animal-related

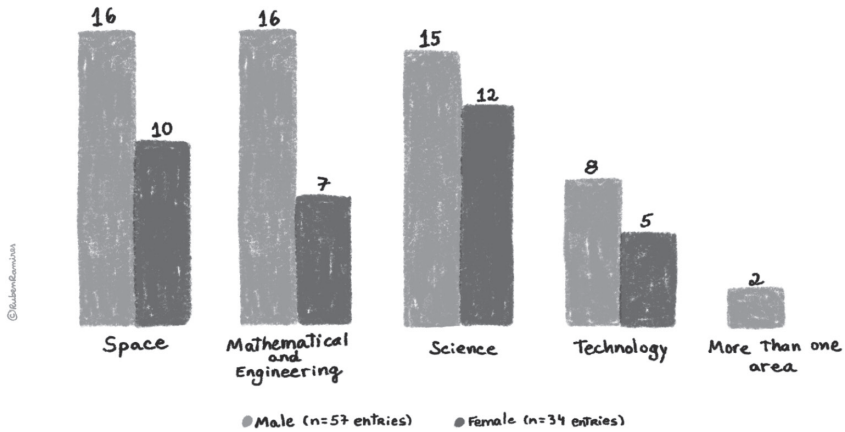


Figure 8.1 STEM-related interests and number of entries by gender. Graphic design by illustrator Ruben Ramires.

interests (12 entries); to space exploration (10 entries); mathematical and engineering skills (7 entries) and technology-related pursuits, including the use of cell phones and computers (5 entries). Examples for male characters were drawn from 31 books, whereas for female characters, examples came from 21 books.

While STEM-related interests represented 12% of all interests for both genders, there was a significant gender gap in their representation, with male characters being nearly twice as frequently depicted in these areas with a difference of 57 to 34. Upon reviewing the bar graph (see Figure 8.1) and comparing interests, science, and technology display similar values, while noticeable differences emerge in the areas of space exploration and mathematical and engineering pursuits.

STEM-related professions

Upon examining professions, it was found that, of the 161 entries detailing professions for male characters, STEM-related careers accounted for 11 entries (6.8%), including scientists (4 entries), astronauts (4 entries), and inventors (3 entries). In contrast, among the 47 options available for female characters, only two (4.2%) were STEM-related, depicting two young girls aspiring to become either a scientist or an astronaut (see Figure 8.2).

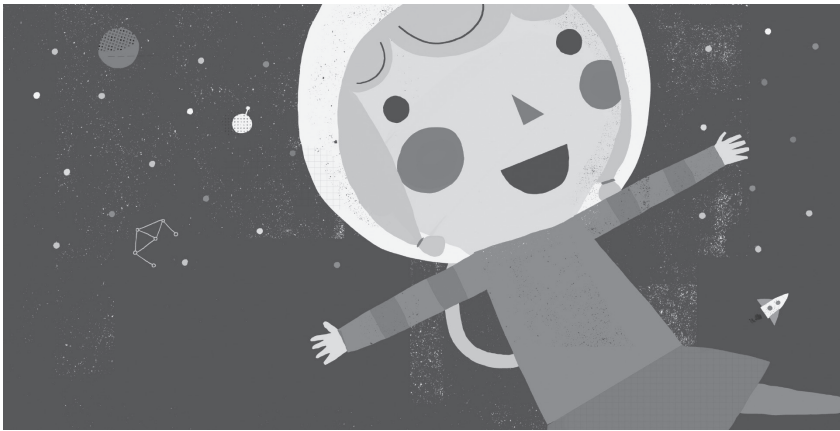


Figure 8.2 Illustration of a girl as an astronaut, from the book *O tesouro do palácio* [The palace treasure]⁵ (Saldanha & Kono, 2012, p. 16).

While the representation of STEM-related professions could be enhanced for both genders, it is notable that male characters significantly outnumber female characters in these fields, a discrepancy of 9 entries. Male characters are represented twice as often as female characters in the professions of scientists and astronauts, and they are also depicted as inventors. Moreover, when considering all career options, male characters exhibit a wider range of choices, consistent with earlier findings cited (Weitzman et al., 1972; Hamilton et al., 2006; Jackson & Gee, 2005; Nunes, 2019) and with the widespread nature of stereotypes across various cultures and time periods.

STEM-related psychological traits and appearance

Psychological traits and physical attributes were among the additional categories examined to identify those embodying STEM-related characteristics. Research by Bian et al. (2017), showed that as early as age 6, children are already associating “brilliance” more strongly with males, while girls begin to avoid activities to which one needs to be “really, really smart” (p. 389). Other recent studies across diverse cultures have emphasized the consistent association of science with masculinity, with scientists predominantly depicted as “white males wearing lab coats, eyeglasses, with facial hair, and an eccentric appearance” (Thomson et al., 2019, p. 2). My research aligns with these findings, observing that while both female and male characters were described with adjectives denoting intelligence, terms such as “wise,” “genius,” “specialist,” “exceptional,”

and “prodigy” were solely associated with male characters. Furthermore, the portrayal of STEM professions perpetuated the stereotypes mentioned earlier, i.e. about who embodies brilliance and succeeds in science, exclusively depicting white, male characters wearing lab coats, glasses, and exhibiting eccentric appearances.

On the other hand, when close reading examples through *gender reading lenses*, it is also interesting to note some nuances. For example, in one text quote depicting a male character’s interest in mathematics, we can read

Avó de coração [Grandma of my heart]

“48.62 was the result of the complicated problem the teacher gave. (...) Everyone got it right, except me. I put the comma, and 486.2 was the result.” (Taquelim & Milhões, 2019, p. 16).

In another example, from the book *De caras* [Obvious! /Easy!]⁶

“He took an accounting course, but since he really enjoys keeping books, he became a librarian.” (Letria & Letria, 2011).

The first example challenges the stereotype that male characters invariably succeed at STEM areas, for this quote comes from a male character, demonstrating that boys can also encounter difficulties in mathematics. In the second instance, the quote presents another male character who, despite having an academic background linked with “numbers,” discovers a passion for literature and becomes a librarian, a role commonly associated with female characters. These examples accentuate the significance of qualitative analysis and demonstrate how labelling a book as merely “stereotypical” or “non-stereotypical” fails to recognize the nuanced and intricate depiction of gender roles within its narrative. In the next topic I will address some of these nuances, by present three examples of my close readings.

Once upon a time... a close reading of three books

An important finding of my research, which underlines the magnitude of the male characters’ representation, was an overlapping of their agency and power, even in narratives where female characters take the lead. A close reading of the books *Desarrumar* [Messing up] (Santos & Carmo, 2010), *Falha de cálculo* [Calculation failure] (Santos & Carmo, 2010), and *A Menina que via o mar de várias cores* [The girl who saw the sea in various colours] (Gonçalves & Sousa, 2018) yields crucial insights to support this assertion. I will provide a concise summary of these three close readings.

The books *Desarrumar* and *Falha de cálculo* are part of the book series “Brincar com a matemática” [Playing with mathematics]. Both contain a Preface by Nuno Crato, a professor of mathematics and statistics, and

former Minister of Education. In these prefaces he discusses fostering a love for mathematics beyond school, weighing the significance of fiction books as platforms to talk about numbers in a fun way. Both books revolve around the main character, Gertrudes, an expert in geometrical shapes, but which also puns on the idea of “being in shape,” as she is represented in a pink tight-fitting outfit and is always exercising (which also reinforces stereotypes of colour and of body issues).

In the first book, *Desarrumar* the concept of “seriation” is addressed through the idea of “tidying up” and “messing up,” seemingly referring to the domestic sphere. There are two female characters, Gertrudes, an adult who likes keeping things tidy and specializes in geometric shapes, and Anabiribana, a child who loves making a mess and imagining stories. The third character is a male puppet called Fantoche [Puppet]. He is mean and Gertrudes and Anabiribana are afraid of him because he is always yelling and bossing them around. In this book, it is clear that even though there are two main female characters, masculine power still rules. Gertrude’s aptitude in geometric shapes is referred to as “conceited” by Fantoche, and Gertrudes replies

“Me? Conceited? Not at all! I just really like geometric shapes, that’s all. I know everything about them... Nobody knows more than me! I can explain everything about any geometric shape. Everything about cubes, rectangular prisms, everything! What I know could fill bags and bags...” (Santos & Carmo, 2010, p. 14, own translation).

This portrayal of female confidence and knowledge being labelled as conceited by a non-human, male character asserting authority is further highlighted through the introduction by Dr. Nuno Crato on the opening pages, indicating a notable disparity in the recognition of expertise between femininity and masculinity in this context.

The little girl, Anabiribana, begins by telling a story about a world of mathematics, a world where the inhabitants live happily doing calculations, solving problems, and reciting multiplication tables. Once again, despite the positive connection between the female character and mathematics, the narrative unfolds into a romance between a blue cube and a pink sphere, a “mathematical marriage.” This narrative twist reveals that, despite Anabiribana’s outward interest in mathematics, her true longing lies in a fairy tale marriage between a prince and princess.

The second book of the series, *Falha de Cálculo* features the same female characters, Gertrudes, and the little girl Anabiribana and it introduces another male character, Cálculo Mental [Mental calculation], an eccentric man dressed in white lab coat, who recites the formula for the square of the hypotenuse and saves the day by solving the puzzle behind a message flashing on a big screen. Gertrudes, wearing her pink lycra suit relies on

Cálculo Mental's problem-solving skills, as she struggles with mathematical problems. Anabiribana loves math signs and multiplication tables, although she gets very scared when faced with the puzzle to solve. Female characters in the book do not understand politics, do not know how to tell time, nor can they calculate time differences between countries. Cálculo Mental, who specializes in complex calculations, is depicted as absent-minded but also exceptional and one of a kind.

To sum up, despite most of the actions being carried out by female characters in these two books, there is a significant inequality of power and recognition compared to the male characters. Even though the book series is designed to stimulate an interest in mathematics, the two female characters featured seem more concerned with housekeeping, tidying up, and marriage, and they are completely overshadowed by the two male characters: the puppet character and the man in the white lab coat.

In *A Menina que via o mar de várias cores*, a young girl discovers her unique ability to observe plankton in the sea, which attracts the interest of scientists. Despite her innate power, a male scientist assists her in interpreting her visions. However, she is abducted by a group of scientists – two males and a female dubbed a “sorceress.” Ultimately, with the help of two other male characters, the young girl escapes. It all ends well, as she is invited to talk about her special powers at a conference, but only men are present on the panel, and even in the audience, they seem to outnumber women significantly. Even though the girl is the main character, aspiring to be a scientist when she grows up, there is a clear message about who belongs on the stage, and who holds the authority. The girl's knowledge, which is almost magical in character, is juxtaposed with male knowledge, which is adult, institutionalized, and rational. Despite the fact that the writer is herself a biologist and the narrative is inspired by her own professional trajectory (as revealed by the biography given in the paratext), the story inadvertently reinforces male authority. The use of masculine forms in non-gender-specific contexts, especially prominent in highly gendered languages like Portuguese, can lead to ambiguity regarding inclusivity. For example, using the masculine plural *os chefes* to refer to bosses or leaders may not necessarily imply the inclusion of female individuals, but rather reflects a linguistic convention where the masculine form is conventionally used to represent all genders which further strengthens male dominance in traditionally male-dominated fields and the symbolic annihilation of female competences (Caldwell & Wilbraham, 2018).

“... os chefes da Agência Espacial Europeia” [the chiefs of the European Space Agency] (Gonçalves e Sousa, 2018, p. 41)

“... os chefes do grande congresso dos cientistas” [the chiefs of the great congress of scientists] (Gonçalves e Sousa, 2018, p. 43)

Once upon and beyond... the binary

Beyond these examples that reveal several gender stereotypes, albeit with occasional positive elements, there are other noteworthy books that contribute to promoting equality and diversity within STEM fields. Some of the contributing factors may include the abstract nature of their illustrations, as observed in *Horizonte* [The horizon] (Celas, 2018), and occasional close-up viewpoints, as depicted in *Com o tempo* [With time] (Martins & Matoso, 2015), as shown in Figure 8.3. These characteristics make it difficult to attribute gender to objects and actions, which is a positive aspect contributing to diversity.

In terms of gender diverse characters, there was only one example associated with STEM, in the book *A nuvem* [The cloud] (Mendes & Fazenda, 2018). Initially perceived as a male character holding a phone (depicting technology use), this immediate classification as male is defied by the fact that he has long hair and somewhat androgenous looks, which is unusual, and thus challenges binary representations.



Figure 8.3 Illustration of a computer from the book *Com o tempo* (Martins & Matoso, 2015, p. 34).

The expansion and development of picturebooks in Portugal yields a positive influence, as they often challenge conventional narrative structures, which are more descriptive of characters and their actions. Picturebooks usually value illustrations and visual components over textual information, often adopting a more poetic approach, allowing space for readers to interpret, and for mediators to facilitate conversations. In addition to these examples that go beyond the binary, it is important to also celebrate the interaction of female and male characters participating in STEM-related activities together, in a harmonious, complementary dynamic, much like the real interactions among children, e.g. *Impossível* [Impossible] (Sobral, 2018), as portrayed on Figure 8.4.

Conclusions

Gender stereotyping in Portuguese children's literature has attracted increasing attention from scholars in recent years, and it is hoped that this study may make a significant contribution to the area. It underscores the crucial role of recommended children's books as influential tools in shaping societal norms and providing essential role models for children in their formative years.



Figure 8.4 Illustration of a girl and a boy, from the book *Impossível* (Sobral, 2018, pp. 32–33).

In the period under analysis (2009 to 2019), it is not clear cut whether there has been a positive shift or a reduction in gender-stereotypical representations. In STEM-related portrayals, varied across different years, ranging from positive role models to perpetuating stereotypes, with male characters overshadowing females. This study reaffirms the observation that children's books often fail to accurately depict progress made in this respect (Nunes, 2019). Specifically, the overrepresentation of males in mathematics and science fields does not align with the demographics of Portuguese society. Women continue to be underrepresented in STEM fields in Portugal, but the specific details are more complex: While women make up only 31.7% of graduates in engineering, manufacturing industries, and construction, they constitute 46.7% of graduates in science, mathematics, and computer science. When the category "science, mathematics, and computer science" is examined more closely, it reveals high rates of female participation in science and mathematics but lower rates in computer science (Fernandes et al, 2023). The books analyzed therefore reflect this underrepresentation of women, even exaggerating the disparity, which is regrettable given the influence that such works have on the perceptions and imagination of the children that read them.

Of course a stereotype-filled book could serve as a platform for initiating a conversation about gender stereotyping provided that the children have someone to guide them in how best to interpret these messages. The power would then reside with those who read, present, and discuss the books with the children (though even this carries a certain risk, as parents and other mediators may sometimes impose their own stereotypical views). Children, on the other hand, also possess agency and can take an active role in constructing their understanding of gender (West & Zimmerman, 1987; Connell, 2002). As gender is negotiated in a dynamic process, so is the content of a book and its audience's interpretation. In this respect, we cannot really attest to a direct and intended transfer of meaning to the reader, nor can we assume that children are uncritical in their reception of this information, acting as passive recipients (Mallan, 2002; Kimmel, 2011). Likewise, assessing the precise impact of a book or story on children's stereotypes, measuring potential shifts in their thinking and gender biases, and especially predicting the duration of these changes is exceedingly challenging. Reader-response studies, which explore these effects, are uncommon, making it harder to draw conclusive insights into the lasting effects of literature on children's perceptions and stereotypes. But there are some authors who aspire to discover the positive impact of books, suggesting that exposure to gender-atypical storybooks might challenge children's gender stereotypes about gender-appropriate roles and impact children's future career goals and aspirations (Abad & Pruden, 2013). When reflecting on the recurring patterns of stereotypes, there is

an opportunity for creative efforts to either reshape these stereotypes or even harness them in beneficial ways. Therefore, gender literacy applied to gender stereotyping in books (i.e. *gender reading lenses*), can empower readers to identify gendered messages within any book, promoting the critical thinking that enables children to challenge stereotypes and demand high-quality books.

The books recommended by the PNL are commonly found in libraries and schools. While their focus is not explicitly centred on promoting gender equality or feminist ideals, as a far-reaching public policy initiative, they play a pivotal role in advocating for high-quality literature.⁷ These books have a unique opportunity to offer positive role models, celebrate diversity, and nurture growth. Equally, the outcomes of my research shall extend beyond academia, by inciting conversations about this topic and the associated reflective processes. This dissemination can occur in schools, libraries, through initiatives involving authors and publishers and cultural events aimed at children and families. Children's books can provide the frames to see the world in certain ways, either perpetuating stereotypes or, more importantly, promoting non-conformity, resistance, and alternatives (Mallan, 2002), by presenting examples of "Once upon a time stories" about an equal world, so all of us readers dare to make them come true.

Notes

- 1 World Economic Forum (2022). *Global Gender Gap Report 2023. Insight Report 2023*. World Economic Forum. Available at www3.weforum.org/docs/WEF_GGGR_2023.pdf
- 2 This study is a component of an ongoing doctoral study in Sociology at the CIES research center within ISCTE University in Lisbon. The PhD programme is supported by a scholarship from Foundation for Science and Technology, identified by reference number SFRH/BD/146404/2019.
- 3 Even though these two forms of publishing might share abundant illustrations, similar formats, and certain paratextual elements, the difference between the two lies in the relation between text and image. In picturebooks, the two semiotic codes intertwine, operating together rather than independently, in an "intimate, challenging, and provocative dialogue between distinct languages that converge, complement, and intermingle to tell a story" (Ramos, 2011, p. 18).
- 4 Quantitative stands for the examination of manifest content that is physically present and can be quantified, and qualitative allows for the examination of latent content that requires an interpretative reading of its symbolic meaning and contextualization.
- 5 All book titles and translated excerpts are own translations.
- 6 This is a Portuguese expression to say that something is "obvious" or "easy," but in this case, it is also a pun referring to the other meaning of "caras," i.e. "faces," because it is a mix and match book where we can have hundreds of different men's faces.

7 In the context of my doctoral research, interviews will be conducted with specialists from the PNL. One of the anticipated outcomes is to stimulate the incorporation of gender concerns into the criteria for recommending books.

References

Primary sources

- Celas, C. (2018). *Horizonte*. Orfeu Negro.
- Gonçalves, V., & Sousa, R. (2018) *A menina que via o mar de várias cores*. Gradiva.
- Letria, J. J., & Letria, A. (2011). *De caras*. Pato Lógico.
- Martins, I. M., & Matoso, M. (2015). *Com o tempo*. Planeta Tangerina.
- Mendes, R. C., & Fazenda, J. (2018). *A Nuvem*. Pato Lógico.
- Saldanha, A., & Kono, Y. (2012). *O tesouro do palácio*. Caminho.
- Santos, M. F., & Carmo, I. (2010). *Desarrumar*. Gaialivro.
- Santos, M. F., & Carmo, I. (2010). *Falha de cálculo*. Gaialivro.
- Sobral, C. (2018). *Impossível*. Orfeu Negro.
- Taquelim, C., & Milhões (2019). *Avó de coração*. Zero a Oito.

Secondary sources

- Abad, C., & Pruden, S. M. (2013). Do storybooks really break children's gender stereotypes? *Frontiers in Psychology*, 4(986), 1–4. <https://doi.org/10.3389/fpsyg.2013.00986>
- Basow, S. A. (1992). *Gender: Stereotypes and roles* (3rd edn). Thomson Brooks/Cole Publishing Co.
- Bian, L., Leslie, S. J., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science*, 355, 389–391. <https://doi.org/10.1126/SCIENCE.AAH6524>
- Caldwell, E. F., & Wilbraham, S. J. (2018). Hairdressing in space: Depiction of gender in science books for children. *Journal of Science & Popular Culture*, 1(2), 101–118. https://doi.org/10.1386/jspc.1.2.101_1
- Cardullo, V. B. M. (2022). Picturebooks in the primary grades: Representation and the stories shared about who belongs in STEM. *Early Childhood Education Journal*, 10, 1–14. <https://doi.org/10.1007/s10643-022-01379-2>
- Connell, R. W. (1987). *Gender and power: Society, the person and sexual politics*. Polity Press.
- Connell, R. W. (2002). *Gender*. Polity Press.
- Denzin, N. K. (2017). *The Research Act: A theoretical introduction to sociological methods* (1st edn). Routledge. <https://doi.org/10.4324/9781315134543>
- Fernandes, A. M., Marvão, L., & Miguek, S. (2023). *Igualdade de género em Portugal: Boletim estatístico 2023*. [Gender equality in Portugal: Statistics bulletin 2023] Comissão para a Cidadania e a Igualdade de Género (CIG). www.cig.gov.pt/area-igualdade-entre-mulheres-e-homens/indicadores/
- Golombok, S., & Fivush, R. (1994). *Gender development*. Cambridge Press.
- Hamilton, M., Anderson, D., Broadus, M., & Young, K. (2006). Gender stereotyping and under-representation of female characters in 200 popular children's

- picture books: A twenty-first century update. *Sex Roles*, 55, 757–765. <https://doi.org/10.1007/s11199-006-9128-6>
- Jackson, S., & Gee, S. (2005). “Look Janet”, “No you look John”: Constructions of gender in early school reader illustrations across 50 years. *Gender and Education*, 17(2), 115–128. <https://doi.org/10.1080/0954025042000301410>
- Kimmel, M. (2011). *The gendered society* (4th edn). Oxford University Press.
- Lindsay, J. (2023). Where have all the girls gone? Examining gender representation within children’s picture books. *Journal of Research in Childhood Education*, 38(3), 433–458. <https://doi.org/10.1080/02568543.2023.2280790>
- Mallan, K. (2002). Picturing the male: Representations of masculinity in picture books. In J. Stephens (Ed.), *Ways of being male: Representing masculinities in children’s literature and film* (pp. 15–37). Routledge.
- McCabe, J., Fairchild, E., Grauerholz, L., Pescosolido, B. A., & Tope, D. (2011). Gender in twentieth-century children’s books: Patterns of disparity in titles and central characters. *Gender & Society*, 25(2), 197–226. <https://doi.org/10.1177/0891243211398358>
- Moya-Guijarro, A. J., & Ventola, E. (Eds.). (2022). *A multimodal approach to challenging gender stereotypes in children’s picture books*. Routledge. <https://doi.org/10.4324/9781003145875>
- Neves, S., & Nogueira, C. (2005). Metodologias feministas: A reflexividade ao serviço da investigação nas ciências sociais [Feminist methodologies: Reflexivity and research in social sciences]. *Psicologia: Reflexão e Crítica*, 18(3), 408–12. <https://doi.org/10.1590/s0102-79722005000300015>
- Nikolajeva, M., & Scott, C. (2006). *How picturebooks work*. Routledge. <https://doi.org/10.4324/9780203960615>
- Nunes, A. (2019). Estereótipos de género nos livros infantis premiados [Gender stereotypes in award-winning children’s books]. *Elos - Revista de Literatura Infantil e Juvenil*, 6, 77–97. <https://doi.org/10.15304/elos.6.5867>
- Ramos, A. M. (2010). *Literatura para a infância e juventude: Leituras em diálogo [Children’s and young adult literature: Readings in dialogue]*. Tropelias & Companhia.
- Ramos, A. M. (2011). Apontamentos para uma poética do álbum contemporâneo [Notes on the poetics of the contemporary picturebook]. In B. -A. Roig Rechou, I. Soto López, & M. Neira Rodríguez (Eds.), *O álbum na literatura infantil e juvenil (2000-2010)* (pp. 13–40). Edicións Xerais de Galicia.
- Serafini, F., & Reid, S. F. (2023). Multimodal content analysis: Expanding analytical approaches to content analysis. *Visual Communication*, 22(4), 623–649. <https://doi.org/10.1177/1470357219864133>
- Taylor, F. (2003). Content analysis and gender stereotypes in children’s books. *Teaching Sociology*, 31(3), 300–311. <https://doi.org/10.2307/3211327>
- Weitzman, L., Eifler, D., Hokada, E., & Ross, C. (1972). Sex-role socialization in picture books for preschool children. *American Journal of Sociology*, 77(6), 1125–1150. <https://doi.org/https://doi.org/10.1086/225261>
- West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender and Society*, 1(2), 125–151. www.jstor.org/stable/189945