Is there a color for sustainability in fashion products? A case study with Brazilian slow fashion footwear

Ítalo José de Medeiros Dantas[1], Marcelo Curth[1], Débora Pires Teixeira[2], Glauber Soares Junior[3], Fabiano Eloy Atílio Batista[3]

[1] *Department of Cultural Processes and Expressions, Feevale University, Novo Hamburgo, Brazil. italodantasdesign@hotmail.com; marcelocurth@feevale.br*

[2] *Department of Heritage, Culture and Society, Federal Rural University of Rio de Janeiro, Seropédica, Brazil. deborapite@gmail.com*

[3] *Department of Design, State University of Minas Gerais, Ubá, Brazil. glaubersoares196@hotmail.com; fabiano_jfmg@hotmail.com*

Corresponding author: Ítalo José de Medeiros Dantas (italodantasdesign@hotmail.com)

ABSTRACT

This study investigates the intersection of slow fashion and the semiotics of color in the context of Brazilian footwear. Slow fashion, as a counterpoint to fast fashion, emphasizes sustainability, quality, and ethical practices, advocating for timeless designs and conscious consumption. Within this framework, the research explores how Brazilian slow fashion brands, Vegalli and Urban Flowers, utilize color to communicate sustainability and engage eco-conscious consumers. Using visual analysis and semiotic theory, 33 footwear items were examined to classify colors by hue, saturation, and color lightness. The results highlight a predominance of achromatic and earthy tones, reflecting principles of durability, functionality, and a connection to nature. Selective use of vibrant hues, such as green and orange, introduces environmental and emotional resonance, while neutral tones enhance versatility and longevity. These findings underscore the aesthetic and symbolic role of color in reinforcing sustainability narratives, contributing to brand identity and consumer engagement. This research enriches the discourse on sustainable design and cultural dimensions in fashion, offering perspectivas and contributions for designers, brands, and scholars.

KEYWORDS Slow fashion, Sustainability, Brazilian footwear, Color semiotics, Sustainable design, Ethical fashion, Color meaning

RECEIVED 13/01/2025; **REVISED** 21/03/2025; **ACCEPTED** 24/03/2025

1. Introduction

The fashion industry, one of the most dynamic and influential sectors globally, plays a significant role in shaping consumer behavior and cultural narratives. However, this industry is also known for its substantial environmental impact, characterized by excessive waste generation, high water consumption, and chemical pollution. In recent years, the rising demand for sustainable practices has urged the fashion industry to reevaluate its production processes and communication strategies, fostering a new wave of environmentally and ethically driven innovations.

Within this shift, the slow fashion movement has emerged as a counterpoint to the fast-paced, mass-production-driven fast fashion model. Rooted in principles of sustainability, slow fashion emphasizes quality over quantity, promoting longer product lifespans, ethical labor practices, and eco-conscious materials. In this context, visual communication, particularly color, plays a pivotal role in aligning products with the values of sustainability and in influencing consumer perceptions of environmentally friendly practices.

Color, as a fundamental element of design, extends beyond its aesthetic appeal to function as a powerful semiotic tool. It communicates symbolic and cultural meanings that can evoke emotions, shape consumer preferences, and establish brand identities. In sustainable fashion, specific colors, such as green, blue, and earthy tones, have been associated with environmental consciousness and ethical practices. However, the cultural and regional dimensions of these associations remain underexplored, especially in countries with unique socio-environmental contexts like Brazil.

Brazil, recognized for its biodiversity and cultural diversity, provides a compelling backdrop for examining sustainability in fashion. The growing interest in sustainable fashion practices within the Brazilian market has led to the development of slow fashion brands that integrate local craftsmanship, natural materials, and environmentally friendly production processes. Despite these advancements, there is limited research on how these brands use color to convey sustainability in their products, particularly in footwear—a category often overlooked in sustainability studies.

Given the environmental challenges posed by the global fashion industry and the unique potential of slow fashion in Brazil, this study seeks to fill a gap in the literature. Thus, understanding how Brazilian slow fashion brands utilize color to communicate sustainability in footwear not only sheds light on local design practices but also contributes to broader discussions about sustainable fashion communication strategies. By focusing on color as a semiotic and cultural element, this study provides perspectives into how design choices can enhance sustainability narratives.

Therefore, the primary objective of this study is to investigate whether specific colors are associated with sustainability in Brazilian slow fashion footwear and to analyze how these associations influence consumer perceptions. Through this case study, the research aims to deepen the understanding of color's role as a visual and symbolic element in sustainable fashion, ultimately contributing to the advancement of more effective and culturally relevant design strategies within the industry.

2. Theoretical framework

This topic presents the theoretical foundations that support the research proposal. Initially, we present the concept of slow fashion and its developments. Next, we discuss the aesthetic attributes of sustainable products. Finally, we highlight the role of color as a sign and its influence on the communication of sustainability in fashion products.

2.1. *Slow fashion*

The textile and fashion industry, from an economic perspective, is of great importance to the country's development. According to the Brazilian Textile Industry Association (ABIT, 2021), it "represents 16.7% of jobs and 5.7% of the revenue in the manufacturing industry," with Brazilian fashion being present "among the five largest fashion weeks in the world." Furthermore, the country has more than 100 fashion schools and colleges. However, this industry is also one of the most environmentally degrading (Silva, 2014), particularly because it involves a production process that has grown at the same rate as its accessibility to the masses over the years.

Given that the essential raw materials for the production of fashion items are extracted from nature, large-scale production is directly responsible for numerous environmental impacts—such as the disposal of textile waste in landfills, the release of chemical residues into rivers, increased consumption, among many other issues. From this perspective, the textile and fashion industry is considered one of the most polluting in the world (Berlim, 2012; Menegucci et al., 2015). Within the logic of an overconsumption-driven society, the fashion industry creates artifacts characterized by their ephemerality, often resulting in products that are practically disposable. In this sense, trend-producing fashion has long been responsible for seasonal clothing consumption, spreading the idea that what is "in fashion" today may be considered outdated tomorrow (Lipovetsky, 2009; Berlim, 2012).

In light of these impacts, it is increasingly essential to seek more ecological ways to produce and consume more consciously, aiming for a more sustainable production chain (Solino, Teixeira, & Dantas, 2020). As a result, initiatives have been developed to focus on creating products through creative means that extend the life cycle of fashion items. In this context, techniques are grounded in intertwining themes of creativity, economy, and sustainability (Fletcher & Grose, 2002).

Fashion design, when it bases its products on sustainable production methods, results in actions that help reduce environmental impacts, consequently improving people's quality of life. Thus, sustainability becomes fundamental in the conception of new products, as it emphasizes reuse and the reduction of natural resource extraction, minimizing environmental degradation (Menegucci, 2015). Within this framework, many fashion brands design their products with the intent to prolong their life cycle and usability, adhering to the principles of slow fashion—a term translated as "slow fashion."

The slow fashion movement emerged in 2003 at the University of London's Fashion Design course, comprising a "[...] political-ideological repertoire strictly linked to the premises of social and environmental sustainability and simultaneously organizing and expressing ethical and aesthetic criticisms" (Berlim, 2016, p. 11). According to the author, this movement opposes the fast fashion model—characterized by accelerated serial production of items—while addressing issues that range from creativity to the politicization of consumption, culminating in political activism. Slow fashion is understood as a movement that integrates other critical movements within the fashion system, such as sustainable and ethical fashion (Solino, Teixeira, & Dantas, 2020). In this sense, it represents both an ideological and practical condition for the fashion field (Berlim, 2016).

Fashion produced slowly aspires to sustainable fashion, as it opposes the hegemonic production system and the challenges posed by companies—a notable difficulty since slow fashion has broader concerns than the product itself. This model focuses on practices and consumption modes, contrary to the goals of businesses solely driven by profit and predominantly oriented by the fast fashion model (Solino, Teixeira, & Dantas, 2020). Slow fashion proposes more than slowing down clothing production; it envisions new and conscious consumption practices that extend the lifespan of products. Additionally, it fosters empowerment and political activism within fashion (Berlim, 2016).

Thus, slow fashion is an initiative aimed at raising awareness about reducing the pace of accelerated production to create sustainable fashion products. Unlike mass-market production, a garment gains added value when produced in limited quantities following sustainability principles and when its quality ensures significant longevity. Beyond the sustainable qualities of this type of production, small-scale manufacturing also addresses another constant issue in the fashion field: usability. Through this process, custom-made garments can be created, with designs based on the anthropometric measurements of the intended wearer (Nishimura & Gontijo, 2016).

2.2. *Aesthetic attributes of sustainable products*

The aesthetic aspect of sustainable products, especially regarding design issues, has proven to be of extreme importance at various stages of decision-making processes (from design conception to commercialization). Particularly, aesthetics within the realm of sustainable products has emerged as a factor that is difficult to delineate due to its qualitative, fluid, and complex nature. Broadly speaking, the origin of the term "aesthetics" dates back to Ancient Greece, where it was understood as "sensory perception," and later as "sensory pleasure," emphasizing not only issues related to what is perceived as beautiful but also sensations, emotions, meanings, and tastes. Thus, aesthetics, when associated with sustainable products, is challenging to define, often being labeled with terms such as Green Design, Eco Design, among others, aiming to establish a relationship between aesthetics and product design with its "potential" for sustainability (Moreira, Jaques, & Pizzato, 2018; Clementino & Arruda, 2018; Petersen & Brockhaus, 2017; Jardim & Pavan, 2014; Chim & Blebea, 2013).

The issues surrounding the design and aesthetics of products significantly influence consumer behavior since the communicative aspect of products, especially the visual aspect, is, to a large extent, an essential factor in attracting and capturing the attention of potential consumers. It is through this initial visual contact that consumers identify themselves, as this contact is crucial in the relationships and perceptions of consumption between people and objects, making it an important marketing strategy (Moreira, Jaques, & Pizzato, 2018; Clementino & Arruda, 2018; Petersen & Brockhaus, 2017; Jardim & Pavan, 2014; Chim & Blebea, 2013).

As emphasized earlier, the aesthetic appearance of a product should not be limited to beauty or "superficial" elements; it should relate to the product's success, sustainability, and longevity. According to Chim & Blebea (2013), the aesthetic aspects of products should be linked to emotional factors that inspire consumers and induce attachment. In the authors' view, this aesthetic should "attract" and "stimulate" a variety of impulses in individuals, giving them sensations of durability, desirability, attractiveness, among other positive aspects..

2.3. *Color as a sign and its role in communicating sustainability*

Color, as an integral part of visual communication, goes beyond aesthetic appeal to function as a semiotic tool for delineating and conveying messages. According to Pereira (2023), color operates within a system of signs where its attributes—hue, lightness, and chroma—serve as meaningful units contributing to the construction of meaning. This systemic view aligns with Saussure's semiology, which defines language as a structured set of signs and emphasizes the relational nature of meaning-making (Santaella, 2002). In this context, color assumes syntactic, semantic, and pragmatic dimensions that dictate its interaction with other visual elements and its interpretative potential (Caivano, 1998).

In the syntactic dimension, color relationships, such as contrasts or harmonies, structure visual compositions. These relationships, highlighted by Caivano (1998), are fundamental for perceiving color as a system of signs. The semantic dimension addresses the connection between color and the objects or ideas it represents. This connection is often based on cultural conventions, exemplified by the use of red to signal danger or passion. Lastly, the pragmatic dimension explores the impact of color on viewers, shaping their interpretations and emotional responses. Pereira (2023) emphasizes the triadic nature of the sign—comprising the sign itself, its object, and its interpretant—when analyzing the role of color in product design.

The cultural specificity of color associations further expands its semiotic function. As noted by Heller (2013), colors carry varied meanings across cultures, requiring designers to adapt their choices to the cultural context of their target audience. This adaptability is crucial, as mismatches in color symbolism can lead to misinterpretations and reduce the communicative effectiveness of a design (Holtzschue, 2012). Similarly, Arnkil (2013) highlights the potential of color to evoke strong, culturally embedded symbols, especially when effectively combined with form and text.

Considering the informational role of color in fashion (Guimarães, 2000; Dantas & Silva, 2022), Heller (2013, p. 18) asserts that no color is devoid of meaning, as "[...] context is the criterion that will reveal whether a color will be perceived as pleasant and correct or wrong." In the field of sustainability, colors that most evoke this idea are generally shades of green, widely associated with nature and trees (Pastoureau, 1997; Farina et al., 2006; Aballí, 2010; Pastoureau, 2011; Heller, 2013). Clementino, Barbosa, and Fernandes (2017, p. 260) emphasize that "when the goal of using color is to communicate sustainability, some studies highlight the relevance of green hues, which the literature points to as associated with this theme." Beyond green, literature also identifies other colors linked to sustainability, such as yellow (associated with the sun and light), brown (associated with the earth), and blue (evoking the sky). These tones collectively reinforce the connection between sustainability and representations of nature (Farina et al., 2006).

While green and blue are traditionally associated with sustainability and environmental responsibility, recent marketing strategies have exploited this symbolism through practices like greenwashing and bluewashing (Szabo; Webster, 2021; Sailer; Wilfing, 2022). Greenwashing occurs when companies misleadingly present their products or policies as environmentally friendly (Szabo; Webster, 2021; Sansoni Torrens; Downs, 2023), while bluewashing refers to the strategic use of sustainability narratives to enhance corporate image without substantial commitments (Sundar; Kellaris, 2015; Sailer; Wilfing, 2022). These phenomena highlight the importance of critically analyzing the use of colors in branding and communication, as the symbolic attachment to these hues may not always reflect genuine sustainable practices (Burgh-Woodman; King, 2013). Incorporating this perspective reinforces the need for a nuanced understanding of color associations in the context of sustainability (Worakittikul; Saenwerm; Naruetharadhol, 2024).

In fashion, there is evidence of the role of color in communicating sustainability, particularly in building narratives that connect consumers to environmental and ethical values. Song and Choi (2010) note that neutral, pale, and low-saturation tones are widely used in eco-design due to their association with functionality and sustainability, as well as their aesthetic connection to nature. This approach is complemented by Dong et al. (2023), who highlight consumers' preference for low-purity and low-brightness colors, such as teal, which evoke feelings of tranquility and harmony. These chromatic choices reflect a convergence between aesthetics and the perception of sustainable value, as consumers tend to associate these colors with a more conscious experience aligned with environmental preservation (Song & Choi, 2010; Dong et al., 2023).

Additionally, Dogar et al. (2023) expand this discussion by emphasizing the role of colors in promoting ethical and sustainable practices through a visual narrative that highlights earthy and natural tones, such as greens, browns, and blues. These hues enhance brands' environmental appeal by aligning with natural dyeing practices and the use of eco-friendly materials, reducing the environmental impact of the production cycle (Dogar et al., 2023). By connecting consumers' preferences outlined

by Dong et al. (2023) with the practical applications described by Dogar et al. (2023) and the discussions of Song and Choi (2010), it becomes evident that sustainable colors play a strategic role in strengthening brand identities and amplifying conscious consumption.

There are few studies focusing on colors in slow fashion artifacts, with none specifically addressing footwear. In clothing, it is observed that the perception of product colors is strongly influenced by symbolic associations that link tones to sustainable practices, as previously discussed. According to Dantas et al. (2021), colors like brown and blue are often associated with sustainability due to their relationship with natural elements, such as earth and sky, and the appearance of more natural dyeing processes with less industrial intervention. Additionally, in other dimensions, medium saturation levels and high brightness reinforce the idea of less artificial and more environmentally conscious products, as they convey a sense of reduced pigment use and lower environmental impact (Dantas et al., 2021).

3. Methodology

This research is based on applied research, aiming to be exploratory-descriptive (Gil, 2008). The methodological procedure guiding this study involves a case study (Yin, 2014), focusing on the Brazilian footwear industry, specifically brands that produce slow fashion.

3.1. *Definition of the brands and footwear studied*

For the analysis of the visual language of slow fashion footwear, the process began with the selection of brands to be studied. This initial step allowed us to obtain images of the artifacts, which were subsequently subjected to analysis. As a reference, we used a report published by Meio Sustentável (2024) regarding Brazilian sustainable footwear brands highlighted in the same year. Specifically, nine Brazilian brands were identified: Vegalli, Insecta Shoes, Kasulo, Urban Flowers, Ahimsa, Vegano Shoes, Havaianas, Yellow Factory, and Margaux.

Next, we individually analyzed each brand to determine whether they positioned themselves as slow fashion on their website or Instagram, aiming to maintain consistency in the research proposal. From the nine initial brands, seven were eliminated—either because they positioned themselves only as ecological or sustainable or because they were no longer in the market. Ultimately, only Vegalli and Urban Flowers were retained.

The Brazilian slow fashion sector remains relatively small, which posed a challenge in selecting brands that strictly align with this concept. A common issue in the market is the conflation of slow fashion with sustainability—while sustainable footwear aims to minimize environmental impacts through material choices and production efficiency, slow fashion extends beyond environmental concerns to include ethical production, local manufacturing, small-scale operations, and timeless design, fostering mindful consumption. Our study was strictly focused on slow fashion artifacts, and many brands were excluded because they positioned themselves solely as sustainable rather than fully embracing the slow fashion philosophy. Additionally, some brands were no longer in operation at the time of data collection, further reducing the sample. These exclusions, while limiting the statistical weight, ensured that the selected brands genuinely represented the slow fashion movement and allowed the study to shed light exclusively on this specific market scenario.

In the end, to define the artifacts to be analyzed, we opted to focus on products that both brands had in common. This criterion led to the selection of boots as the object of study, as it is the only type of footwear sold by Vegalli and one of the types offered by Urban Flowers. A total of 8 images of artifacts from Vegalli and 25 from Urban Flowers were collected, all showing the product from a lateral view (Figure 1).

The product images used in this study were sourced directly from the official websites of the selected brands, ensuring that the colors analyzed were those presented by the manufacturers themselves. Since the Meio Sustentável (2024) portal does not provide product images, it was used solely as a reference for identifying brands aligned with slow fashion principles. To maintain image consistency, all selected visuals adhered to predefined criteria, including uniform lateral perspectives and a preference for high-resolution images without evident overlays or excessive filters. However, we acknowledge that variations in lighting, post-processing, and display settings may introduce discrepancies in color representation. While such inconsistencies are a known limitation, our methodological approach—focusing on official brand imagery and using the Adobe Color eyedropper tool for extraction—aimed to minimize distortions and ensure that the analysis captured the closest possible representation of the colors intended by the manufacturers

3.2. *Data analysis*

To analyze the use of color in slow fashion footwear, a methodology is proposed that focuses on identifying, mapping, and classifying the colors present in the selected products. The aim is to understand how color choices align with sustainability narratives and how these colors contribute to the perception of slow fashion values.

The analysis begins by extracting the official colors of the footwear using the eyedropper tool in Adobe Color software, ensuring precision in identifying the exact hues represented in the product images. Each artifact is analyzed from a lateral perspective, as previously defined, to maintain consistency across the dataset.

The identified colors are then mapped into an Excel table, classified according to three key attributes (Clementino et al., 2021):

- **Hue:** The pure color, categorized into standard color groups (e.g., red, blue, green).
- **Saturation:** Differentiating between neutral (muted or subdued tones) and intense (vivid or vibrant tones) colors.
- **Color lightness:** Evaluating whether the colors are desaturated (lighter, washed-out tones) or darkened (reduced brightness).

.

Fig. 1. Brazilian footwear mapped as "slow fashion" by the brands Vegalli and Urban Flowers.

For multicolored or patterned footwear, each visible color was considered individually. This approach ensures that all hues present in the design are accounted for and analyzed separately in the classification process.

To ensure a precise identification of colors, both monochromatic and patterned products were analyzed together, with each individual color extracted and classified separately according to hue, saturation, and lightness.

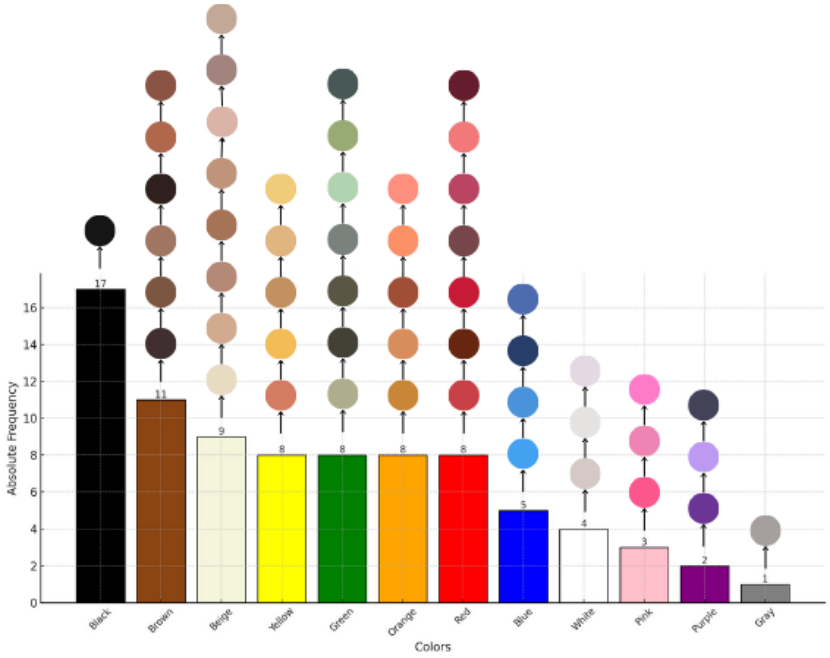

Fig. 2. Frequency of colors in the studied slow fashion footwear.

This approach allowed for a consistent mapping of chromatic choices across all footwear samples. However, for the evaluation of the semantic dimension of color—considering its symbolic and communicative aspects—monochromatic and patterned products were treated as distinct categories. This differentiation aimed to account for the potential differences in perception between solid colors and those integrated into patterns, ensuring a more nuanced interpretation of their role in conveying sustainability narratives. For example, we notice that the semantic interpretation of a multicolored shoe could be associated with a sense of exclusivity, as the combination of different colors may evoke uniqueness or a personalized design, which adds a layer of meaning beyond the individual colors themselves.

Once the data is collected and organized, visualizations will be created to provide a comprehensive overview of the color trends in the selected slow fashion footwear. These visualizations, such as bar graphs, will highlight the distribution and frequency of specific color attributes across the analyzed products.

4. Results and discussions

This topic will initially present the results of the analysis conducted with slow fashion footwear. Next, we will discuss how their results converge or diverge from the evidence presented in the literature in the area.

4.1. *Results: Color patterns in Brazilian slow fashion shoes*

The analysis of the colors of the 33 slow fashion footwear items revealed a predominance of achromatic and earthy tones, reflecting the aesthetic and functional characteristics associated with the movement. In the analysis presented, each product was considered individually, taking into account all the colors present in it. For each item, the visible shades were identified, and the frequencies of occurrence of these colors were calculated based on their presence in each product. Therefore, the graph reflects the sum of the absolute frequencies of the colors across all the analyzed products. The analysis, thus, considers the color diversity present in products from both brands, providing a more comprehensive view of the most recurring shades across the entire set of items evaluated.

Furthermore, among the most frequent hues, black was found in 17 models, followed by brown (11 models) and beige (9 models) (Figure 2). These colors are often associated with versatility and durability, key characteristics for footwear that emphasizes timelessness and a connection to nature.

Additionally, yellow, green, orange, and red hues appeared with the same frequency, each present in 8 models (Figure 2). These tones add vibrancy to the palette and introduce contrasting visual elements, though they were used in a balanced way to maintain the overall sobriety. Blue (5 models), white (4 models), pink (3 models), purple (2 models), and gray (1 model) were less

frequent, suggesting a more selective application—often found in patterns, possibly targeting specific audience niches or exclusive designs.

Regarding the saturation of the hues present in the footwear, the majority featured neutral colors (20 footwear items) while 13 displayed intense colors (Figure 3). Additionally, from the perspective of color lightness, most footwear items were darkened (23 footwear items)—that is, when black is added to the base color—while 10 were washed-out tones, achieved by adding white to the base color.

Fig. 3. Saturation of colors in slow fashion footwear and examples.

4.2. *Discussions: Hue, saturation and color lightness, a path for the nature*

The analysis of the 33 slow fashion footwear models highlights a predominant use of achromatic and earthy tones, such as black (17 models), brown (11 models), and beige (9 models). These tones are deeply tied to the functional and aesthetic principles of the slow fashion movement, which emphasizes timelessness, durability, and a connection to nature (Jung & Jin, 2014). As Holtzschue (2011) posits, neutral colors like black and brown act as anchors in design, offering a sense of stability and versatility while enhancing the longevity of a product's relevance in an ever-changing market.

Furthermore, the predominance of black in the analyzed slow fashion footwear, underscores its strong connection to atemporality and functionality—key principles of the movement. Black is widely recognized as a versatile color, offering adaptability across various contexts and styles, which reinforces its durability and relevance over time (Holtzschue, 2011). In the context of slow fashion, this aligns with the idea of creating pieces that transcend seasonal trends and emphasize long-term usability (Jung & Jin, 2014). Furthermore, black's association with elegance and sophistication contributes to its ability to maintain visual appeal while supporting the movement's focus on sustainability, as it allows for reduced consumption by fostering prolonged use and wearability (Şener et al., 2019). This strategic use of black exemplifies how slow fashion leverages color to integrate aesthetic appeal with environmental and social responsibility.

Moreover, the balanced inclusion of vibrant hues—yellow, green, orange, and red, each appearing in 8 models—introduces a dynamic visual appeal without compromising the movement's foundational emphasis on moderation and simplicity. These colors often evoke natural elements, with green symbolizing growth and sustainability, as noted by Heller (2013) in her exploration of color psychology. Additionally, their controlled use aligns with Dogar et al.'s (2023) perspective on eco-friendly design, where thoughtful color application fosters emotional resonance and environmental consciousness.

Thus, we observed a combination of those colors with low saturation and lightness in the prints on some of the shoes, featuring embroidered floral motifs. This combination evokes a sense of craftsmanship, creating a nostalgic ambiance reminiscent of an anachronistic yet familiar setting (Figure 4).

The use of purple (2 models) and pink (3 models), primarily in bold and attention-grabbing patterns (Figure 5), highlights their role in promoting exclusivity within the slow fashion movement. These vibrant colors, often associated with creativity, individuality, and luxury, stand out against the predominantly neutral and earthy palette, offering a unambiguous contrast that appeals to niche markets seeking unique and expressive designs (Heller, 2009). In slow fashion, exclusivity is a valued dimension, as it

fosters a sense of rarity and personalization in products (Jung & Jin, 2014). The incorporation of such effecting hues in patterns (Figure 5) amplifies their visual impact, aligning with Şener et al.'s (2019) observation that slow fashion balances aesthetic boldness with ethical values. These choices cater to consumers who prioritize sustainability and also distinctiveness design, positioning slow fashion as a movement capable of delivering both understated and statement-making products.

Fig. 4. Low saturation prints with a craftsmanship and nostalgic sense

Fig. 5. Prints that use pink and purple in intense saturation, in order to achieve exclusivity and differentiation

From a saturation perspective, 20 models featured neutral hues, while 13 incorporated intense colors. Neutral tones are central to the ethos of slow fashion, facilitating adaptability across various settings and enhancing perceived longevity. Dong et al. (2023) highlight that low-purity colors resonate strongly with environmentally conscious consumers, as they evoke a sense of calm and understated elegance. Meanwhile, the use of intense colors, particularly in the context of the Vegalli brand (VX products), projects a sense of adventure and bold identity. This strategy reflects the dual nature of slow fashion, where exclusivity and personal expression are balanced with universal appeal (Şener et al., 2019).

The predominance of darkened hues (23 models) over lightened ones (10 models) might underscores a preference for designs with grounded and sophisticated aesthetics. Darkened tones, achieved by adding black to the base color, reinforce the perception of durability and elegance, echoing Holtzschue's (2011) assertion that darker values add visual weight and maturity to a product. Lightened tones, while less common, bring an air of freshness and optimism, potentially appealing to consumers who value uniqueness within sustainable frameworks (Jung & Jin, 2014).

The intentional application of colors by Vegalli, particularly the more intense hues, represents an alignment with the brand's adventurous and bold identity. Such designs likely target consumers seeking vibrant expressions of individuality within a sustainable context. Heller's (2013) discussion on color associations supports this interpretation, with warm tones like red and orange evoking excitement and energy.

These findings also align with the broader objectives of slow fashion, which strives to balance aesthetic diversity with ecological responsibility. As noted by Jung & Jin (2014), this balance is achieved through careful material and color selection that promotes longer product lifespans while appealing to diverse consumer preferences. Moreover, the integration of vibrant hues within a predominantly neutral palette exemplifies how slow fashion merges functional simplicity with artistic sophistication, thereby fostering a deeper consumer connection to the product and its values.

5. Final considerations

This study analyzed the context of sustainability in fashion products, particularly focusing on Brazilian slow fashion footwear. The main objective was to map the colors used in slow fashion footwear and understand how these choices align with sustainability narratives. Employing a mixed methodology based on case studies, the research combined visual analysis and semiotic theory to unravel the symbolic connections between color and sustainable values in the 33 selected products from Brazilian footwear slow fashion brands.

The findings revealed that achromatic and earthy tones, such as black, brown, and beige, dominate the color palettes of slow fashion footwear, aligning with principles of functionality and timelessness. Additionally, the use of low-saturation tones contributes to a sense of nostalgia and craftsmanship, reinforcing the artisanal essence of the products. While vibrant hues, such as purple and violet, appear selectively, they stand out as symbols of exclusivity. These results underscore the importance of deliberate color choices in reinforcing the values of slow fashion and appealing to environmentally conscious consumers.

The conclusions drawn from this study highlight the dual role of color as an aesthetic and semiotic element in sustainable fashion. By leveraging symbolic associations, designers can enhance the narrative of sustainability, creating products that not only appeal visually but also resonate with the values of eco-conscious consumption. Moreover, the study emphasizes the cultural dimensions of color symbolism, suggesting that designers must consider local contexts to optimize their communication strategies. This approach fosters a deeper connection between products and consumers, ultimately strengthening the movement toward sustainable practices in the fashion industry.

The results of this study highlight how color choices in Brazilian slow fashion footwear reflect not only aesthetic and functional concerns but also deeper geo-cultural influences. The recurrence of specific hues aligns with local material traditions and artisanal practices, suggesting that sustainability communication in fashion is intrinsically linked to regional visual languages. This perspective raises an important consideration: can a culturally embedded chromatic pattern enhance consumer trust in sustainable fashion, or does it risk homogenizing the visual discourse of sustainability? While colors associated with nature and longevity strengthen the narrative of ecological responsibility, their strategic use must also account for contemporary concerns about greenwashing. The extent to which these colors are perceived as authentic indicators of sustainability, rather than marketing devices, depends on a broader engagement with transparency in production practices and consumer awareness. Future research could further explore how these chromatic strategies interact with local and global sustainability perceptions, refining the role of color as both a cultural marker and a semiotic tool in slow fashion.

The research objectives were achieved, providing perspectives into the intersection of color, sustainability, and design strategies. However, the study faced certain limitations, where color analysis was based on product images rather than direct examination of the physical products, which may introduce variations due to lighting conditions, image quality, and digital rendering. Additionally, the limited number of products analyzed may restrict the generalizability of the findings. Furthermore, the results are inherently tied to the specific context in which the study was conducted, including the selection of products, the platform from which the images were sourced, and the methodological approach used, which may limit their applicability to different settings or market conditions.

Future research should explore a wider array of sustainable fashion artifacts, including garments and accessories, while considering diverse cultural and regional contexts. Expanding the scope to include a comparative analysis of consumer preferences across different demographics would also be valuable. Quantitative approaches, such as surveys and experimental studies, could complement qualitative analyses, providing a more comprehensive understanding of how color influences perceptions of sustainability in fashion.

6. Conflict of interest declaration

The authors declare that there is no conflict of interest regarding the publication of this paper.

7. Funding source declaration

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES) - Finance Code 001.

8. Short biography of the author(s)

Ítalo José de Medeiros Dantas - PhD student in Cultural Processes and Expression at Feevale University (Brazil); master's in design from the Federal University of Campina Grande. Multidisciplinary researcher with academic and professional interests in different areas, with an emphasis on Design, Fashion and Statistics.

Marcelo Curth – PhD in Administration from the University of Vale do Rio dos Sinos, master's degree in administration and business from the Catholic University of Rio Grande do Sul, and degree in Sports Sciences from the Lutheran University of Brazil (ULBRA). He is a professor in the Graduate Program on Cultural Processes and Expression at Feevale University, working as a researcher on the topic of Marketing: Identity and Culture.

Débora Pires Teixeira - Associate Professor at UFRRJ (Brazil), specializing in History of Fashion, Garment

Production, Textile Crafts, and Aging. She holds a Master's and Doctorate in Home Economics from UFV (Brazil) and coordinates research on Gender, Work, and Consumption. Organizer of the Fashion, Management, and Design Seminar and member of NUPEVEM (Clothing and Fashion Research Center, interinstitutional).

Glauber Soares Júnior - Professor in the Bachelor of Design program at UEMG, with a Ph.D. in Cultural Processes and Expressions (Feevale) and a Master's in Home Economics (UFV). Graduated in Fashion Design (IF Sudeste MG). His research interests include Fashion Design, Textiles, Textile Crafts, Material Culture, and Gender, with a focus on regional and local cultures. Specializes in cultural and material studies.

Fabiano Eloy Atílio Batista - Professor in the Bachelor of Design at UEMG (Ubá). Holds a Ph.D. and Master's in Work, Social Issues, and Social Policy (PPGED/UFV). Currently a Ph.D. candidate in Art, Fashion: History and Culture (PPGACL/UFJF). Focuses on Social Policy, History, and Culture in Fashion and Design, combining academic expertise and interdisciplinary research in arts and social issues.

Notes

[1] https://meiosustentavel.com.br/sapatos-sustentaveis/. Accessed on: December 26, 2024. We used "Meio Sustentável" considering the platform's reach in the sustainability field for Brazil and the relevance of the published news, allowing us to identify brands that are still operational.

Licensing terms

References

Aballi, I. (2010) *Sobre a cor: tratado em preto e branco para seu uso e aplicação [On Color: A Treatise in Black and White for Its Use and Application].* São Paulo: Projeto Octógono Arte Contemporânea. Pinacoteca do Estado de São Paulo. Catálogo de exposição.

ABIT (2020) *Perfil do Setor. Dados gerais do setor referentes a 2019 (atualizados em dezembro de 2020) [Sector Profile. General Data for 2019 (updated December 2020)].* Available at: https://www.abit.org.br/cont/perfil-do-setor (Accessed: 15 February 2021).

Arnkil, H. (2013) *Colours in the visual world.* Helsinki: Aalto.

Berlim, L. (2012) *Moda e Sustentabilidade: uma reflexão necessária [Fashion and Sustainability: A Necessary Reflection].* São Paulo: Estação das Letras e Cores.

Berlim, L. (2016) *Transformações no Campo da Moda: crítica ética e estética [Transformations in the Field of Fashion: Ethical and Aesthetic Critique].* Doctoral thesis. Programa de Pós-graduação de Ciências Sociais em Desenvolvimento, Agricultura e Sociedade, UFRRJ, Rio de Janeiro.

Burgh-Woodman, H. and King, D. (2013) 'Sustainability and the human/nature connection: a critical discourse analysis of being "symbolically" sustainable', *Consumption Markets & Culture*, 16(2), pp. 145–168.

Caivano, J. L. (1998) 'Color and semiotics: A two-way street', *Color Research & Applicatio*n, 23(6), pp. 390–401.

Chim, I. S. and Blebea, I. (2013) 'The aesthetic value: a green attribute of sustainable product design', *Acta Technica Napocensis*, 56(2), pp. 367–374.

Clementino, T. O. and Arruda, A. J. V. (2018) *'Por uma estética voltada à sustentabilidade: estudos para configuração de novos artefatos ecologicamente orientados' [Towards an Aesthetic Oriented to Sustainability: Studies for the Configuration of New Ecologically Oriented Artifacts],* in Design, Artefatos e Sistema Sustentável. São Paulo: Blucher, pp. 87–106.

Clementino, T. O., Barbosa, E. B. and Fernandes, T. K. S. (2017) 'Menos é mais: a percepção dos consumidores sobre o uso da cor em embalagens sustentáveis' [Less is More: Consumers' Perception of Color Use in Sustainable Packaging], *Revista Educação Gráfica*, 21, pp. 257–277.

Clementino, T. O., Silva, I. F. and Arruda, A. J. V. (2021) 'Ferramenta para auxílio à análise visual' [Tool for Visual Analysis Assistance], *Educação Gráfica*, 25(1), pp. 28–48.

Dantas, Í. J. M. and Silva, C. A. P. (2022) 'Correlação entre a intenção dos designers e a interpretação das cores de uma coleção de vestuário por pessoas da Geração Z' [Correlation Between Designers' Intentions and the Interpretation of Colors in a Clothing Collection by Generation Z], *Modapalavra e-periódico*, 15(36), pp. 8–34.

Dantas, Í. J. M., Batista, F. E. A., Júnior, G. S., Oliveira, I. F. and Silva, C. A. P. (2021) *'Matiz, saturação e claridade, o reflexo da natureza: o papel da cor na configuração estética de produtos de moda slow fashion' [Hue, Saturation, and Lightness, the Reflection of Nature: The Role of Color in the Aesthetic Configuration of Slow Fashion Products]*, ENSUS 2021, 130–141. Available at: https://repositorio.ufsc.br/handle/123456789/228860 (Accessed: 7 October 2021).

Dong, Z. J., Liang, J. F., Zhang, Z. J. and Wei, S. S. (2023) 'The Perceptual Evaluation of Clothing Sustainable Color in Clothing Design', *Journal of Fiber Bioengineering and Informatics*, 16(3), pp. 229–241.

Farina, M. et al. (2006) *Psicodinâmica das cores em comunicação [Psychodynamics of Colors in Communication*]. São Paulo: Edgar Blucher.

Fletcher, K. and Grose, L. (2011) *Moda e Sustentabilidade: Design para mudança [Fashion and Sustainability: Design for Change].* Translated by Janaína Mendonça. São Paulo: Editora SENAC.

Gil, A. C. (2008) *Métodos e técnicas de pesquisa social [Methods and Techniques of Social Research].* 6th edn. São Paulo: Editora Atlas SA.

Guimarães, L. (2000) *A cor como informação: a construção biofísica, linguística e cultural da simbologia das cores [Color as Information: The Biophysical, Linguistic, and Cultural Construction of Color Symbolism].* São Paulo: Annablume.

Heller, E. (2013) *A psicologia das cores: Como as cores afetam a razão e a emoção [The Psychology of Colors: How Colors Affect Reason and Emotion].* Translated by L. L. da Silva. São Paulo: Gustavo Gili.

Holtzschue, L. (2012) *Understanding color: an introduction for designers.* Hoboken: John Wiley & Sons.

Jardim, P. K. S. and Pavan, L. D. (2014) 'O mercado sustentável e a valorização do ecoproduto: algumas perspectivas' [The Sustainable Market and the Valorization of Eco-Products: Some Perspectives], *Revista Eletrônica Diálogos Acadêmicos*, 7(2), pp. 123–137.

Jung, S. and Jin, B. (2014) 'A theoretical investigation of slow fashion: sustainable future of the apparel industry', *International Journal of Consumer Studies,* 38(5), pp. 510–519.

Lipovetsky, G. (2009) *O império do efêmero: a moda e seu destino nas sociedades modernas [The Empire of the Ephemeral: Fashion and Its Fate in Modern Societies].* São Paulo: Companhia das Letras.

Menegucci, F. et al. (2015) *'Resíduos têxteis: análise sobre descarte e reaproveitamento nas indústrias de confecção' [Textile Waste: Analysis of Disposal and Reuse in the Clothing Industry],* in Congresso Nacional de Excelência em Gestão, Rio de Janeiro. CNEG&OINOVARSE, pp. 1–12.

Monte, K. D., Yousaf Gill, I., Mashooq, N. and Haider Durrani, A. (2024) 'How Shapes and Colors Drive Sustainable Fashion and Eco-Friendly Graphic Design', *Journal of Policy Research*, 10(2), pp. 165–173. doi: 10.61506/02.00219.

Moreira, A. C., Jacques, J. J. and Pizzato, G. Z. A. (2018) 'Atributos estéticos e sustentabilidade: estudo de caso com mochilas de marcas gaúchas' [Aesthetic Attributes and Sustainability: Case Study with Backpacks from Gaucho Brands], *Revista Educação Gráfica*, 22(2), pp. 334–348.

Nishimura, M. D. L. and Gontijo, L. A. (2016) *'Slow fashion e o produto de moda com enfoque no usuário' [Slow Fashion and Fashion Products Focused on the User],* in 12° Congresso Brasileiro de Pesquisa e Desenvolvimento em Design, São Paulo. São Paulo: Editora Blucher, pp. 4796–4804.

Pastoureau, M. (1997) *Dicionário das cores do nosso tempo: simbólica e sociedade [Dictionary of the Colors of Our Time: Symbolism and Society].* Translated by M. J. Figueiredo. Lisboa: Editorial Estampa.

Pastoureau, M. (2011) *Preto: história de uma cor [Black: History of a Color].* Translated by L. P. Zylberlitch. São Paulo: Editora Senac São Paulo.

Pereira, C. (2023) 'A cor como signo: fundamentos para uma abordagem semiótica das cores no design' [Color as a Sign: Fundamentals for a Semiotic Approach to Colors in Design], *Estudos em Design,* 31(1).

Petersen, M. and Brockhaus, S. (2017) 'Dancing in the dark: Challenges for product developers to improve and communicate product sustainability', *Journal of Cleaner Production*, 161, pp. 345–354.

Sailer, A., Wilfing, H. and Straus, E. (2022) 'Greenwashing and bluewashing in Black Friday-related sustainable fashion marketing on Instagram', *Sustainability*, 14(3), p. 1494.

Sansoni, S., Torrens, G. and Downs, S. (2023) 'The role of graphic design in promoting sustainability and ethical responsibilities against greenwashing', in *DS 123: Proceedings of the International Conference on Engineering and Product Design Education (E&PDE 2023)*.

Santaella, L. (2002) *Semiótica aplicada [Applied Semiotics].* São Paulo: Thomson/Cengage Learning.

Şener, T., Bişkin, F. and Kılınç, N. (2019) 'Sustainable dressing: Consumers' value perceptions towards slow fashion', *Business Strategy and the Environment,* 28(8), pp. 1548–1557.

Silva, C. M. S. (2014) *'Moda e Sustentabilidade: reuso de jeans para o desenvolvimento de produtos comerciais com valor agregado do Design' [Fashion and Sustainability: Reuse of Jeans for the Development of Commercial Products with Added Design Value],* in 2° Contexmod - Congresso Científico Têxtil e de Moda. São Paulo: [s.n.].

Solino, L. J. S., Teixeira, B. M. L. and Dantas, I. J. M. (2020) 'The sustainability in fashion: a systematic literature review on slow fashion', *International Journal for Innovation Education and Research*, 8(10), pp. 164–202.

Song, J. E. and Choi, K. H. (2010) 'Eco-design color trends in fashion', *Journal of the Korean Society of Clothing and Textiles*, 34(3), pp. 492–507.

Sundar, A. and Kellaris, J. J. (2015) 'Blue-washing the green halo: how colors color ethical judgments', in *The Psychology of Design*, pp. 63–74. Routledge.

Szabo, S. and Webster, J. (2021) 'Perceived greenwashing: the effects of green marketing on environmental and product perceptions', *Journal of Business Ethics*, 171, pp. 719–739.

Yin, R. K. (2014) *Case Study Research Design and Methods*. Canadian Journal of Program Evaluation, 30(1), pp. 108–110.