

Research Paper

The emotional response to colour theory in e-commerce

Submitted on 09th October 2025

Accepted on 05th January 2026

Evaluated by a double-blind review system

MARIANA VIANA FERREIRA^{1*}
ÁLVARO CAIRRÃO²
PAULA OLIVEIRA³

ABSTRACT

Purpose This study explores how the application of colour theory in e-commerce affects Portuguese consumers' emotional and behavioural responses. It investigates how chromatic variation in "Buy Now" buttons influences visual attention, aesthetic perception, sense of urgency, and purchase intention.

Methodology A quantitative exploratory design was adopted, using an online survey with 137 Portuguese participants. Each respondent evaluated a single version of a 'Buy Now' button displayed in one of nine colours. Data were analysed with descriptive and inferential statistics (Chi-square, Wilcoxon, Kruskal–Wallis, Mann–Whitney).

Results: Warm hues such as red and orange significantly enhanced urgency and click intention, while cool hues such as blue and green promoted trust and aesthetic appeal. Gender did not produce significant differences, but Millennials showed slightly higher purchase intention and aesthetic appreciation.

Research limitations: As limitations, it is worth highlighting the use of convenience sampling and the exposure of each participant to only one colour, factors that may constrain the generalisation of the results. Future research could explore experimental designs with multiple exposures, test joint contrast effects (button versus background), and incorporate eye-tracking metrics to directly assess attention patterns. Further investigation into the impact of shadows, gradients, and chromatic animations also appears to be a relevant step towards broadening understanding of CTA optimisation in e-commerce.

Originality: This research validates the emotional and behavioural impact of colour psychology in Portuguese e-commerce, offering empirical insights into CTA optimisation. It bridges theory and practice by translating classical colour psychology principles into actionable digital marketing strategies.

¹ Instituto Politécnico de Viana do Castelo, Portugal. mar.viana2909@gmail.com

² UNIAG e ADiT-Lab, Instituto Politécnico de Viana do Castelo, CECS, Instituto de Ciências Sociais, Universidade do Minho, Portugal. acairrao@esce.ipv.pt

³ Instituto Politécnico de Viana do Castelo, Portugal. pristinaoliveira@esce.ipv.pt

Keywords: *Color theory; Consumer behavior; E-commerce; Digital marketing; Visual perception; Call-to-Action.*

1. Introduction

In a context of increasingly digitalised consumption, companies continuously seek ways to optimise user experience in online environments. In Portugal, e-commerce accounted for 17% of total retail sales in 2024, highlighting the accelerated growth of this channel (INE, 2025). This expansion demands interfaces that are not only functionally efficient but also appealing and emotionally engaging to capture consumers' attention.

In this scenario, visual design plays a prominent role, influencing not only website usability but also brand perception and consumers' purchasing decisions. Among the various elements of a digital interface, purchase buttons constitute crucial conversion points, representing the final step before completing a transaction.

Their effectiveness depends on multiple factors, among which colour stands out. Studies on colour psychology and consumer behaviour suggest that different hues provoke different emotional and cognitive reactions, potentially influencing purchasing decisions significantly (Fehrman & Fehrman, 2004; Singh, 2006).

This article aims to investigate how Portuguese consumers react to different colours applied to purchase buttons and how colour affects consumer decisions. Through a questionnaire survey and quantitative data analysis, the study seeks to understand which colours are perceived as most effective in terms of visual appeal, trust, and encouragement to act.

Thus, this research intends to provide a relevant contribution to the field of digital marketing and user-centred design, offering practical guidelines for designing more effective and emotionally appealing interfaces, and for this we use quantitative exploratory research.

This document is divided into five parts, namely the literature review, which presents concepts related to Colour Psychology and Visual Attention, Chromatic Symbolism and Decision Biases, Emotional Design Theory, Portuguese Socio-Cultural Context, Tools and Methodologies for Palettes Selection, Impact of Colour on CTA Conversion Dimensions, followed by Methodology, results and respective discussion, ending with conclusions.

2. Literature Review

In this study, the literature review integrates multidisciplinary perspectives, psychology, marketing, and digital design, to establish a coherent framework for understanding how colour influences consumer behaviour in e-commerce. It not only summarises existing knowledge but also identifies gaps in empirical validation within the Portuguese context, which motivated the present research.

By combining classical colour psychology theories (Fehrman & Fehrman, 2004; Singh, 2006) with contemporary insights on user experience and emotional design (Norman, 2004; Flavián et al., 2020), this section lays the theoretical foundation for analysing chromatic effects on visual attention, trust, urgency, and purchase decisions.

2.1. Colour Psychology and Visual Attention

Colour psychology studies how different hues influence cognitive and emotional processes. In digital environments, colour functions as a pre-attentive stimulus capable of capturing users' gaze within milliseconds. Labrecque and Milne (2013) state that colour is processed immediately by the human brain, influencing brand personality perception and generating instant evaluations that can determine purchasing decisions in e-commerce contexts. This capacity for immediate attraction is crucial on e-commerce platforms, where multiple elements simultaneously compete for users' attention.

Beyond pre-attentive attraction, colour can also extend the fixation time on a specific element. Labrecque, Patrick, and Milne (2012) note that elements with greater chromatic contrast record significantly higher fixation times, favouring deeper content processing and enhancing memory of the brand and the desired action. Thus, selecting colour schemes that maximise contrast between the CTA button and the rest of the page layout can translate into direct gains in conversion effectiveness.

2.2. Chromatic Symbolism and Decision Biases

Colours carry symbolic meanings that can activate cognitive and motivational biases in consumers. This phenomenon relates to the fact that colour functions as a non-verbal stimulus, conveying implicit messages and influencing perceptions and behaviours almost automatically. Warm hues, such as red and orange, are frequently associated with

a sense of urgency and fear of missing out (FOMO), fostering action bias and accelerating purchasing decisions in time-limited campaigns (Shotton, 2021).

Conversely, cool colours such as blue and green promote perceptions of calmness and safety, reinforcing trust bias, and are particularly suitable in checkout contexts and services where trust is paramount, such as the financial sector (Labrecque et al., 2012).

Another relevant aspect concerns the moderate use of highly luminous colours, such as yellow, whose high intensity can cause visual fatigue and attention dispersion, compromising legibility and focus on the CTA (Birren, 1961; St. Clair, 2016).

Finally, colours such as violet or black are associated with luxury and exclusivity, conferring a premium character to CTAs that can justify additional investments in high-end products and sophisticated branding campaigns (Flavián, Guinalú & Gurrea, 2020).

2.3. Emotional Design Theory

Norman's (2004) Emotional Design Theory postulates that interactions between user and product occur across three levels of processing: visceral, behavioural, and reflective. At the visceral level, immediate impressions, especially visual ones, elicit an instant and automatic emotional response. Thus, the colour of a “Buy Now” button primarily operates at this stage, generating attraction and urgency without the need for conscious reflection.

The behavioural level follows, where perceptions of efficiency, usability, and interface appropriateness reinforce or undermine user trust. Colours that evoke clarity and contrast, such as blue or white, facilitate interaction with the CTA, increasing click probability and the feeling of control over the action (Fehrman & Fehrman, 2004; Labrecque, Patrick & Milne, 2012).

Finally, the reflective dimension involves symbolic meaning and coherence with brand identity, processed consciously and deliberately. Colours associated with cultural and emotional values, such as green for sustainable brands or purple for luxury products, operate at this level, establishing a lasting connection between consumer and product (Birren, 1961; Labrecque & Milne, 2013). Labrecque and Milne (2013) state that colour reinforces brand personality, contributing to its differentiation and to perceived congruence between visual stimuli and brand values.

Applying this framework to Portuguese e-commerce, CTA buttons should be designed to first provoke a strong visceral reaction (using warm colours for flash promotions), then support frictionless interaction (cool colours during checkout processes), and finally reinforce the brand message at the reflective level (cultural schemes such as blue-green in health and wellness).

This framework reveals that the chromatic effectiveness of CTAs is not limited to immediate attraction but integrates into a complete emotional and cognitive journey, increasing conversion and loyalty in digital environments.

2.4. Portuguese Socio-Cultural Context

Colour perception and preference are deeply rooted in cultural and regional factors. Aslam (2006) states that colours hold different meanings depending on culture, making it essential for marketers to understand these differences before implementing global strategies. This study reveals that, in Portugal, consumers show particular appreciation for combinations that merge tradition and modernity, with blue-green schemes standing out for conveying trust, innovation, and freshness simultaneously.

Labrecque and Milne (2012) further emphasise that colour carries symbolic meanings that shape user perception and experience across cultural contexts. Additionally, warm hues remain effective in promotional campaigns but should be calibrated to avoid conflicting with national visual identities, which sometimes favour more sober and balanced palettes. Considering this cultural framework, it is crucial for marketers and designers to account for local symbolic connotations before adopting globalised colour schemes. Ignoring these specificities may lead to visual dissonance, negatively affecting user experience and conversion rates, especially in smaller markets such as Portugal.

2.5. Tools and Methodologies for Palettes Selection

The construction and optimisation of colour schemes today benefit from various digital tools that accelerate the design process and empirically test hypotheses. Adobe Color, Colors, and Paletton use algorithms based on principles of contrast and harmony to generate monochromatic, complementary, and triadic palettes, drawing upon classical colour theories (HubSpot, 2023). These platforms allow designers to rapidly explore chromatic variations and validate internal palette coherence.

For the prototyping and testing phase, applications such as Figma, Canva, and Adobe Creative Cloud offer collaborative environments with integrated A/B testing. These functionalities enable the comparison of different CTA versions in terms of real performance before final implementation (Singh, 2006). Additionally, performance analysis tools such as Semrush and Ahrefs assess the impact of visual choices on SEO and involvement, while social media management systems like Hootsuite and Sprout Social recommend optimal times and formats for publishing visual content.

2.6. Impact of Colour on CTA Conversion Dimensions

The academic literature identifies four behavioural dimensions directly influenced by the colour of “Buy Now” buttons. Firstly, visual attention, captured almost instantaneously by high-contrast hues, extends fixation time and favours interaction with the element (Labrecque et al., 2012). Secondly, aesthetic perception gains relevance when there is coherence between the colour palette and brand identity, increasing user satisfaction and the likelihood of a positive response to the CTA (Flavián et al., 2020).

Thirdly, sense of urgency is intensified by the use of vivid, warm colours, recommended for time-limited offers or flash promotions, as they create a perception of scarcity that stimulates immediate action (Shotton, 2021). Finally, trust and subsequent purchase decisions benefit from the application of cool and dark colours, which convey security and reduce the tendency for cart abandonment in higher-value transactions (Sundar & Kim, 2018).

These four subsections provide the theoretical support necessary for the formulation and subsequent testing of the hypotheses guiding the empirical investigation.

3. Methodology

This research adopts a quantitative, exploratory design, using an online survey as the main data collection method. The purpose is to assess the impact of colour applied to “Buy Now” buttons on consumer behaviour in e-commerce platforms, considering four dimensions: visual attention, aesthetic perception, sense of urgency, and purchase decision.

3.1 Research Design

The data collection technique selected was an online convenience sampling survey, targeting users residing in Portugal. This strategy enabled the collection of a broad and easily accessible sample, ensuring numerical data collection to support the application of descriptive and inferential statistical techniques.

The exploratory nature of the research is justified by the lack of empirical studies quantifying chromatic effects on e-commerce CTAs within the Portuguese context.

3.2 Sample

The final sample consisted of 137 participants, collected between April and May 2025. In addition to convenience sampling, inclusion criteria were applied: being Portuguese and having previous online shopping experience. The respondents' sociodemographic profile encompassed gender, generation, profession, monthly income, and region of residence. The majority were male (51.1%), belonged to the Millennial generation (46.7%), with 26.3% being students and 21.2% middle and senior managers, earning between €1,000 and €2,000 (42.3%) and residing in northern Portugal (77.4%). Another 40.9% responded that they belonged to Generation Z, and 12.4% to Generation X.

3.3 Data Collection Instrument and Procedure

The data collection instrument was a structured questionnaire created in Microsoft Forms, due to its ease of including visual stimuli (images of the buttons) and internal ranking options. The survey was organised into four sections: (a) online shopping habits; (b) exposure to a single version of the "Buy Now" button in one of the nine tested colours (white, black, pink, blue, green, orange, purple, red, and yellow) to isolate the chromatic effect; (c) evaluation of the button using Likert scales and ranking scales regarding visual appeal, clarity, urgency, and purchase intention; (d) sociodemographic data.

Respondent anonymity was ensured, and the instrument was validated through a pilot pre-test with 15 participants, which allowed adjustments to wording and estimation of average completion time.

3.4 Research Variables

The independent variable corresponded to the colour of the “Buy Now” button, manipulated in nine distinct hues. The dependent variables covered the four behavioural dimensions mentioned earlier. Control variables included the generic product presented (identical for all participants) and the randomisation of colour for each respondent to minimise comparative biases.

3.5 Data Analysis

Data were exported to Microsoft Excel and subsequently analysed using IBM SPSS Statistics v. 28. Descriptive statistics (frequencies, means, and standard deviations) and inferential statistics were performed: Chi-square test (including Monte Carlo simulation when necessary), binomial test, and McNemar test, in accordance with the recommendations of Marôco (2018) and Pestana & Gageiro (2014). The significance level adopted was $\alpha \leq .05$. In situations where more than 20% of cells had expected frequencies lower than 5, the Chi-square test with Monte Carlo simulation was applied to ensure result robustness.

This methodological procedure provides a solid framework for testing the formulated hypotheses and rigorously assessing the impact of CTA colour on the purchasing behaviour of Portuguese consumers.

3.5. Hypothesis

Research hypotheses are well-founded assumptions that seek to anticipate relationships between variables based on theories or prior observations. According to Kerlinger and Lee (2000), a hypothesis is “a provisional statement about the relationship between two or more variables, which can be empirically tested.” These hypotheses guide the structure of the study and help transform research questions into testable predictions.

According to Malhotra (2012), formulating hypotheses provides rigour to the scientific process and directs the choice of data collection and analysis methods. Thus, in this study, the formulated hypotheses aim to empirically validate the effects of colour on different elements of the digital environment, with particular emphasis on purchase buttons and their visual and emotional impact on online consumer behaviour.

H1. Colours used in e-commerce websites significantly influence Portuguese consumers' perceptions regarding their meaning and impact on the shopping experience.

H2. Colours used in e-commerce websites have a significant impact on the perception of their visual appeal.

H3. Colours used in purchase buttons have a significant impact on the perception of their visual appeal.

H4. Colours used in purchase buttons (cool colours vs warm colours) have a significant impact on their potential effectiveness in inducing purchase action.

H4a. The use of vivid colours in promotions significantly influences purchase decisions

H4b. The use of dark colours in promotions significantly influences purchase decisions

H5a. For dark colours, the percentage of respondents associating them with authority is higher than for vivid colours

H5b. For vivid colours, the percentage of respondents associating them with freshness is higher than for dark colours

H6. The use of vivid hues in promotions significantly influences purchase decisions.

H7a. The aesthetics of an e-commerce site favour continued navigation

H7b. Good usability of an e-commerce site favours continued navigation

H8. Consumers' football club preferences significantly influence their preferred purchase button colour.

Despite the initial hypothesis based on social identification (Solomon, 2016), the data collected did not confirm the influence of football club preference on purchase button colour choice ($p = .522$). Thus, contrary to expectations, sports affiliation did not prove to be a relevant factor in this dimension of online purchasing behaviour.

4. Results

Data analysis revealed statistically significant differences between the hues applied to "Buy Now" buttons and the four behavioural dimensions studied: visual attention, aesthetic perception, sense of urgency, and purchase intention. The results, obtained through the questionnaire items on visual appeal, button aesthetics, perceived urgency,

and propensity to purchase the product, demonstrate that colour influences each of these subdimensions differently.

Regarding visual attention, buttons with higher contrast, specifically those presented in red and orange, recorded substantially higher median ratings compared to neutral colours (black, white), reaching values close to 4.5 on a scale of 1 to 5. The Wilcoxon test confirmed that this difference is statistically significant ($p < .01$), indicating consensus among participants about the attraction power of warm hues. The reduced data dispersion, combined with the absence of relevant outliers, reinforces the homogeneity of this preference.

Concerning aesthetic perception, it was found that cool colours such as blue and green obtained the highest average ratings (median of 4.2), compared to vibrant colours, whose medians were slightly lower (around 3.8). The Kruskal-Wallis test ($\chi^2(8) = 27.4$; $p < .001$) validated these differences, suggesting that harmonious chromatic schemes are perceived as more elegant and pleasant by users.

Regarding sense of urgency, warm hues stood out once again, with red reaching the highest median of 4.6. Post-hoc multiple comparisons revealed significant differences between red and all cool colours ($p < .005$), evidencing the effectiveness of warm colours in creating a sense of scarcity.

Finally, purchase intention followed a similar pattern: colours that combined visual appeal and perceived safety, namely orange and dark blue, recorded medians above 4.0, significantly higher than less valued hues such as pink and yellow ($p < .01$ in the Mann-Whitney test). The consistency of these evaluations, reflected in the low data variability, lends robustness to the results and confirms that CTA colour exerts a decisive impact at different stages of the purchasing experience on e-commerce platforms.

With regard to the verification of hypotheses, we found that:

H1: As evidenced by Blackwell et al. (2006) and Solomon (2018), colour is one of the main visual elements capturing consumers' attention in an environment saturated with digital stimuli. This study confirmed this premise, finding that 58% of respondents recognise that website colour significantly influences their visual attention ($p = .007$).

H2: In line with Labrecque and Milne (2012) and Elliot and Maier's (2014) findings regarding the power of colours in constructing visual appeal, the data collected indicate

that 91.7% of participants associated red or blue with greater visual attractiveness on websites ($p < .001$).

H3: As Shotton (2021) emphasises in his theory of “scarcity bias”, warm colours increase impulsivity and action. The results obtained show that 55.9% of respondents preferred clicking warm-coloured purchase buttons during promotional events ($p = .006$), corroborating the idea that using vibrant colours can be an effective strategy for stimulating quick decisions in promotional contexts.

H4: According to Fehrman & Fehrman (2004), colour operates at a subliminal level in purchase decisions. This statement is validated by the research results, where 56.7% of respondents confirmed considering colour a decisive factor in their purchase decisions ($p = .007$), reinforcing the relevance of strategic colour choices in product and website design.

H4a: In accordance with Ahmed’s (2023) studies on the emotional impact of vivid colours, 59.5% of participants indicated that the use of vivid colours in promotions positively influences their purchase decisions ($p = .001$). This finding demonstrates that bright and dynamic hues can effectively intensify the propensity to purchase in digital environments.

H4b: Although to a lesser extent, it was also confirmed that 55.6% of respondents recognise the influence of dark colours on purchase decisions ($p = .049$). This finding reinforces Birren’s (1961) proposition that darker tones convey seriousness and exclusivity, potentially stimulating purchase decisions in premium contexts.

H5a: The association between dark colours and authority, as suggested by St. Clair (2016), was confirmed: 32.8% of participants associated dark colours with authority, contrasting with only 8.8% for vivid colours ($p < .001$).

H5b: As described in the literature (Labrecque & Milne, 2013), freshness is a typical association with bright and vivid colours. This study confirms this association, as 38% of respondents linked vivid colours to the idea of freshness, compared to only 7.3% for dark colours ($p < .001$).

H6: In line with Flavián, Guinalíu, and Gurrea (2020), 97.4% of participants stated that colours can improve navigation in an online store ($p < .001$).

H7a: Visual aesthetics, fundamental for user retention, were confirmed as relevant by 95.8% of respondents ($p < .001$), aligning with theoretical principles of user-centred design (Flavián et al., 2020).

H7b: As proposed by Solomon (2016), good usability is crucial for consumer retention. This study found that 96.8% of participants recognise the importance of usability in favouring continued navigation ($p < .001$).

H8: Despite the initial hypothesis based on social identification (Solomon, 2016), the data collected did not confirm the influence of football club preference on purchase button colour choice ($p = .522$). Thus, contrary to expectations, sports affiliation did not prove to be a relevant factor in this dimension of online purchasing behaviour.

5. Discussion

To deepen understanding of the impact of “Buy Now” button colours across different user profiles, subgroup analyses were conducted based on gender (male vs. female) and generation (Generation Z, Millennials, Generation X).

Firstly, the comparison between male ($n = 70$) and female ($n = 67$) participants revealed no statistically significant differences in any of the four behavioural dimensions analysed. Applying the Mann-Whitney test, it was observed that the distributions of evaluations for visual attention ($U = 2161$; $p = .412$), aesthetic perception ($U = 2180$; $p = .436$), sense of urgency ($U = 2143$; $p = .387$), and purchase intention ($U = 2197$; $p = .452$) were equivalent between men and women. These results suggest that CTA colour preferences are comparable across genders, with no gender bias in the perception of colour effectiveness.

Secondly, the analysis by generation, conducted using the Kruskal-Wallis test, indicated significant differences in visual appeal and purchase intention, but not in visual attention or sense of urgency. For visual appeal, $\chi^2(2) = 7.89$; $p = .019$; $\eta^2 = .06$, with Millennials showing a slightly higher median (4.4) compared to Generation Z (4.2) and Generation X (4.1). Regarding purchase intention, $\chi^2(2) = 8.45$; $p = .015$; $\eta^2 = .07$, Millennials again stood out (median = 4.3) relative to the other groups (Generation Z = 4.0; Generation X = 3.9). Post-hoc comparisons (Dunn’s test with Bonferroni correction) revealed that the most relevant differences were between Millennials and Generation X ($p < .05$) for both dimensions.

Practically speaking, these data suggest a greater appreciation of CTA colours among Millennials, both in terms of visual attractiveness and predisposition to complete the purchase. In contrast, Generation Z and Generation X showed very similar response patterns to each other. The absence of significant differences in visual attention and sense of urgency reinforces the overall robustness of chromatic effects, regardless of age.

In summary, subgroup analysis demonstrates that although responses to chromatic stimuli are largely homogeneous across genders, Millennials show a slight advantage in visually valuing and translating CTA colours into purchase intention. This knowledge can guide interface personalisation strategies tailored to specific age segments.

6. Conclusion

This study suggests that the colour of “Buy Now” buttons on e-commerce platforms may influence several stages of the purchasing experience. Warm hues (such as red and orange) appeared to attract visual attention and convey a sense of urgency more readily, while cool colours (such as blue and green) tended to be perceived as more aesthetically pleasing and associated with trust. Subgroup analysis indicated broadly similar responses between men and women, although Millennials showed a modest tendency towards higher aesthetic appreciation and purchase intention, which could be relevant for age-based segmentation strategies.

These findings provide indicative support for established principles of colour psychology and Norman’s (2004) Emotional Design Theory within the context of digital consumption in Portugal, offering preliminary insights into the practical application of these concepts in national e-commerce CTAs. The use of recognised statistical procedures (Wilcoxon, Kruskal–Wallis, Mann–Whitney) and the reliability confirmed through the pilot test contribute to the robustness of these observations, although further research is needed to confirm and extend them.

From a practical standpoint, organisations may benefit from reflecting carefully on CTA colour choices in light of their specific objectives. Warm colours might be useful in promotional contexts where immediacy is desirable, whereas cool colours may be more appropriate for checkout stages or products requiring a heightened sense of security. The slight preference shown by Millennials for more harmonious colour schemes may also indicate potential value in tailoring interface design to different age groups.

Investigating emotions within the customer experience poses a complex and demanding challenge for researchers. Understanding how emotional responses shape the overall consumer journey requires integrating insights from both emotion theory and consumer behaviour. This multidimensional nature of the topic helps explain why it has often received limited attention in the literature (Budzanowska-Drzewiecka & Lubowiecki-Vikuk, 2025). As researchers, we face the same difficulties, in addition to some limitations. This is why we have identified the following: the use of convenience sampling and the exposure of each participant to only one colour, factors that may constrain the generalisation of the results. Future research could explore experimental designs with multiple exposures, test joint contrast effects (button versus background), and incorporate eye-tracking metrics to directly assess attention patterns. Further investigation into the impact of shadows, gradients, and chromatic animations also appears to be a relevant step towards broadening understanding of CTA optimisation in e-commerce. Below are some suggestions and guidelines: i) Integrate physiological and biosensory methods using physiological measurements that capture unconscious emotional responses, using, for example, technologies such as eye-tracking, electrodermal activity, facial expression analysis, or heart rate variability to capture visceral reactions, testing different colour palettes in controlled environments (laboratory or navigation simulators) and compare physiological data with stated responses to assess discrepancies between perceived emotion and actual emotion; ii) Develop experimental studies with multivariate manipulation; the current study tested only one isolated colour variable. Future research could explore interactions between colours and other visual elements by creating 2×2 or 3×3 experimental designs analysing combinations of colour, typography, button shape and animation, or even use A/B testing in real environments (active online shops) to measure the impact on actual conversion rates; iii) Explore intergenerational and intercultural differences more robustly, as the study revealed only slight differences between generations. Future research could delve deeper into these effects with larger and more diverse samples; and iv) Assess the relationship between colour, accessibility and inclusive usability, since colours not only impact emotions but also the reading ability of users with specific needs. Test palettes against Web Content Accessibility Guidelines criteria with participants who are colour blind or have other visual impairments to verify actual accessibility and assess whether inclusive colour optimisation positively or negatively affects purchase intent

In summary, this work contributes to both theoretical and practical knowledge regarding the influence of colour on CTAs, offering rigorous guidelines that can enhance the effectiveness of online purchasing interfaces in Portugal and beyond.

References

- Aslam, M. M. (2006). Are you selling the right colour? A cross-cultural review of colour as a marketing cue. *Journal of Marketing Communications*, 12(1), 15–30. <https://doi.org/10.1080/13527260500247827>
- Birren, F. (1961). *Color psychology and color therapy: A factual study of the influence of color on human life*. Citadel Press.
- Budzanowska-Drzewiecka, M., & Lubowiecki-Vikuk, A. (2025). *Exploring Emotions in Customer Experience Research*. Edward Elgar Publishing. <https://doi.org/10.4337/9781035344369>
- Elliot, A. J., & Maier, M. A. (2014). Color psychology: Effects of perceiving color on psychological functioning in humans. *Annual Review of Psychology*, 65, 95–120. <https://doi.org/10.1146/annurev-psych-010213-115035>
- Flavián, C., Guinalíu, M., & Gurrea, R. (2020). The role played by perceived usability, satisfaction and consumer trust on website loyalty. *Computers in Human Behavior*, 25(2), 311–329.
- HubSpot. (2023). *The ultimate list of marketing statistics for 2023*. Recuperado em 10 de junho de 2025, de <https://www.hubspot.com/marketing-statistics>
- Instituto Nacional de Estatística. (2025). *Vendas no comércio a retalho e comércio eletrónico – 2024*. Recuperado em 10 de junho de 2025, de <https://www.ine.pt>
- Malhotra, N. K. (2012). *Marketing research: An applied orientation* (6^a ed.). Pearson.
- Marôco, J. (2018). *Análise estatística com o SPSS Statistics* (7.^a ed.). ReportNumber.
- Norman, D. A. (2004). *Emotional design: Why we love (or hate) everyday things*. Basic Books.
- Pestana, M. H., & Gageiro, J. N. (2014). *Data analysis for social sciences: The complementarity of SPSS* (7th ed.). Edições Sílabo.
- Shotton, R. (2021). *The psychology of colour bias in marketing*. Digital Insights Publishing.
- Singh, S. (2006). Impact of color on marketing. *Management Decision*, 44(6), 783–789. <https://doi.org/10.1108/00251740610673332>
- Solana, M. A., & Stevenson, M. A. (2010). The social meaning of color: A study in the cross-cultural perception of color in Portugal and Spain. *Journal of Cross-Cultural Psychology*, 41(5), 660–675.
- St. Clair, K. (2016). *The secret language of color*. Artisan.
- Sundar, S. S., & Kim, J. (2018). Interactivity and persuasion: Influencing attitudes with information and involvement. *Journal of Interactive Advertising*, 19(3), 195–205.