Wine Chromatics: The Colorful Language of Wine's Characteristics

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ABSTRACT

The landscape of product and service development has significantly changed recently with the aim of providing customers experiences that are more immersive and engaging. Growing understanding of the significance of sensory marketing and embodied cognition has further heightened this crucial transition. Due of its distinctive multisensory potential, the wine field presents an appealing opportunity to leverage this trend. In order to better understand the role of color in marketing, this research is focused on the relationship between colors and perceived wine's features. By conducting a series of experiments that encompassed both implicit and explicit approaches, our results confirmed that color is a powerful communication tool that significantly shapes our expectations and attention towards wine's features. The explicit approach used is that used by traditional marketing, i.e., the use of surveys with explicit questions asked to participants; as in this case, we explicitly asked the participants to specify their preferences regarding potential color preferences; however, as for the investigation of implicit behavior, a typical paradigm used by psychology was used, i.e., the Dot-Prob paradigm, which is often used to investigate attentional biases and consequently implicit responses. Therefore, acquiring a nuanced understanding of the role of color in the marketing and branding of wine can greatly improve consumer experience and offer valuable insights that can serve as industry best practices. In conclusion, as product development increasingly focuses on creating sensory and interactive experiences for consumers, the focus on understanding the role of color in marketing has intensified. Wine, with its unique potential to stimulate various senses, holds special promise in this regard.

KEYWORDS Color, Marketing, Psychology and Context

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1. Introduction

The past decade has seen a significant shift in product and service development toward creating more sensory and interactive experiences for consumers. This trend has been further emphasized by the growing importance of sensory marketing and embodied cognition, as demonstrated in recent research (Krishna & Schwarz, 2014). Sensory marketing involves engaging consumers' senses to influence their perception, judgment, and behavior, ultimately creating a multisensory experience that adds value. In the wine industry, sensory marketing and embodied cognition play crucial roles in shaping consumer perception, judgment, and behavior (Spence, 2020). Most previous sensory research in marketing has focused on the environment (e.g., store settings or atmosphere; for example, Mattila & Wirtz, 2008; Spence et al., 2014) or the product itself (such as taste, appearance, and odors; for example, Hoegg & Alba, 2007; Peck & Childers, 2003). Little attention has been paid to packaging, a situation in which this document can help improve. Packaging is a critical aspect of marketing offerings and has numerous implications for overall customer experience. Products are presented to consumers wrapped in their unique packaging; the packaging becomes the product's dress and conveys the look and feel during the customer-brand interaction. The key stages of multisensory customer-product interaction can be identified as attention, expectation formation, engagement, and consumption (Stead et al., 2022). Packaging design must consider multisensory customer experience and aim to create positive emotional connections with the brand. Given the amount of marketing stimuli consumers are exposed to on a daily basis, unconscious triggers, such as those that appeal to basic senses, can help marketers attract consumers more efficiently (Krishna, 2012). The total customer experience is the sum of the buying experience (interaction with the sales environment, salespeople, and other customers; Hui & Bateson, 1991), the product experience (interaction with the product; Hoch, 2002), the communication experience (interaction between the company, the customer, and other customers; Krishna et al., 2016), brand experience (interaction with brand-related stimuli such as colors, shapes, and characters; Brakus et al., 2009), and, finally, consumer experience (Brakus et al., 2009). Packaging design and presentation, whether for purchase or consumption, is often a key component of these experiences. From this perspective, the product that, by its nature, falls more than others as a multisensory stimulus is wine (Spence, 2020). As a stimulus, color can be a bridge between top-down (i.e., those driven by consumer experience) and bottom-up processes (i.e., those to which consumers are attracted). or as part of marketing communication. Therefore, packaging must first attract customer attention (Milosavljevic & Cerf, 2008). Extensive research in visual neuroscience has shown that visual attributes that influence the saliency of stimuli can also impact where and how long people fixate on complex displays, such as vending machines or supermarket shelves (Milosavljevic et al. 2012). Therefore, consumers tend to fixate on visually more salient items longer than on less salient ones. Second, recent neuroeconomic studies have demonstrated that the value individuals assign to stimuli when making their choice depends on how much attention they give to those stimuli during the decision-making process (Armel et al., 2008; Krajbich et al., 2010). Specifically, the longer people focus on an object, the more likely they are to choose that object and assign a higher liking score. In this context, the wine product must be able to precisely communicate what is inside the bottle or what the company wants the product to "symbolize." From this perspective, color can be a bridge between top-down (i.e., guided by consumer experience) and bottom-up (i.e., consumers being attracted to it) processes.

Supporting this hypothesis, scientific evidence suggests that regardless of preference, individuals are more likely to choose visually salient options because of the way the brain processes visual information. Furthermore, Milosavljevic et al. (2012) show that at fast decision speeds, visual salience has a greater impact on choices than preferences. The bias increases with cognitive load, especially when individuals do not strongly prefer any of the options. Much evidence suggests that colors evoke feelings (for a review, see Bortolotti et al., 2023; Labrecque et al., 2013) color studies have focused on the use of black and white (see Greenleaf, 2011; Kareklas et al., 2014; Lee et al., 2014). For example, Greenleaf (2011) noted that black and white can be used to automatically evoke a sense of nostalgia. At the cognitive level, Lee et al. (2014) observed that black and white favors the high-level construct (i.e., attention to the abstract, essential, and determinant features of a stimulus), while color triggers the low-level construct (i.e., attention to the concrete, idiosyncratic, and superficial features of a stimulus). Therefore, black-and-white graphics on the packaging would increase the perceived importance of more essential product features over ancillary ones. Visual cues are probably the most studied aspect of involvement in packaging. Given the complexity of decision making in wine selection, consumers rely on multiple sources of information when evaluating wine, including their own knowledge and experience (Barber & Almanza, 2006).

The label is a fundamental source of information for wine consumers, providing details on both intrinsic and extrinsic quality signals (Chaney, 2000; Thomas & Pickering, 2003). Intrinsic signals relate to product characteristics

such as grape variety, region, producer, and wine style. Extrinsic signals are those under the marketer's control, including price, packaging and labelling style, and brand name (Quester & Smart, 1996). Although label design and associated name are themselves external signals, they reside only as one of many quality indicators available on the label. Boudreaux and Palmer (2007) have observed that label design is a fundamental component of a wine brand's image, stating that "bottle labels are particularly relevant to the decision-making process, especially for infrequent wine drinkers." As Barber and Almanza (2006) wrote, "consumers buy with their eyes," explaining the preference of consumers to personally view wines, reading labels as they evaluate possible selections. Color is argued to be the most distinctive visual cue in packaging (Singh, 2006), but its effects depend on many factors such as attention level (Brignell et al., 2009), product consumption frequency (Lick et al., 2017), cultural context (Piqueras-Fiszman et al., 2012), consumer sensitivity to design (Becker et al., 2011), and the product itself (Zellner et al., 2018). A recent review (Spence & Velasco, 2019) summarized the multiple roles of packaging color on consumers' expectations and perception of identity, taste, flavor, fragrance, healthiness, and willingness to pay. Following the review, new contributions have reported that the color of packaging can influence the emotions evoked by a hamburger (Merlo et al., 2018), the color of the inside packaging (i.e., the side in contact with the product) can influence the desirability of yogurt (Van Esch et al., 2019), and the color of the label can influence the expected taste of specialty coffee (De Sousa et al., 2020).

There are different methods for investigating consumer preferences, and in this case, we will start with explicit preferences, as done in traditional marketing.

Through an exploratory study, we investigated which adjectives can be associated with wine characteristics, both positive and negative, in the absence of a standardized online database.

2. Study 1. Explicit experiment

Step 1. Selecting Adjectives

To address the lack of research on the association between color and adjectives related to wine, we conducted an online survey through the Qualtrics platform (Qualtrics, Provo, UT).

The survey included 127-italian adjectives (full list in English in Table 1), all potentially associated with wine, which were taken from online lists of "wine" adjectives found on wine menus (for example, those presented at a dinner table). Participants were asked to rate, on a Likert scale (from 1 = not at all to 10 = completely), the degree to which they felt each adjective was associated with wine.

Abominable	Aromatic	Expensive	Energetic	Generous	Unsatisfactory	Natural	Perfect
Cozy	Sour	Creative	Balanced	Gentle	Interesting	Negative	Dangerous
Acerbic	Bold	Curious	Exaggerated	Genuine	Pointless	Boring	Heavy
Acidic	Austere	Weak	Annoying	Joyful	Aged	Novel	Pleasant
Charming	Beautiful	Delicate	Happy	Young	Italian	Hateful	Positive
Reliable	Organic	Delicious	Fermented	Pleasant	Light	Original	Poor
Aggressive	Ugly	Disappointing	Firm	Graceful	Slow	Horrible	Practical
Cheerful	Good	Dynamic	Strong	Tasty	Fortified	Hostile	Valuable
Lovable	Warm	Messy	Fragile	Unreliable	Local	Excellent	Primitive
Ancient	Bad	Fun	Fresh	Indifferent	Melancholy	Passito	Fragrant
Antipathic	Classic	Sweet	Sparkling	Inferior	Neutral	Pasty	Stinky
Apathetic	Full-bodied	Elastic	Fruity	Insane	Wicked	Fearful	Rich
Harmonious	Short	Elegant	Sparkling	Senseless	Mature	Loser	Relaxed
Superficial	Shy	Sad	Humble	Valorous	Old	Poisonous	Winning
Lively	False	Repulsive	Robust	Romantic	Crude	Rude	Scadent
Dry	Serious	Sincere	Satisfactory	Dirty	Sporty	Extraordinary	

Table 1. Wine adjectives used.

The participant sample consisted of 303 non-expert wine consumers (mean age = 30.1 years old ± 10). Participants gender was equally distributed as 144 were male, 144 were female, and 15 chose not to disclose their gender. Similarly the sample distributed among participants living in the north, center, south, and islands of Italy. To verify any biases towards red wine (and its predominant characteristics), we also asked participants about their wine preferences. The distribution consisted of 83 preferences for white wine, 39 for rosé wine, and 181 for red wine. We then analyzed the results based on consumer preferences, and using a cut-off with of 5 (averagely associated with wine), we selected 56 adjectives related to wine (full list in Table 2), that we then employed in the following study's step.

Acerbic	Aromatized	Expensive	Firm	Pleasant	Local	Perfect	Robust
Acid	Tart	Delicate	Strong	Tasty	Mature	Heavy	Poor
Fascinating	Organic	Delicious	Fresh	Interesting	Natural	Pleasant	Dry
Cheerful	Good	Sweet	Sparkling	Aged	Novello	Valuable	Satisfying
Lovely	Warm	Elegant	Fruity	Italian	Excellent	Primitive	Extraordinary
Ancient	Classic	Balanced	Genuine	Light	Passito	Perfumed	Old
Harmonious	Stout	Fermented	Young	Fortified	Pasty	Rich	Lively

Table 2. Wine adjectives selected.

Step 2. Testing Color-Adjectives associations

In the second step, a new custom-made questionnaire was administered to a different group of participants. The questionnaire presented the preliminary selected list of 56 adjectives to the participants, who were asked to associate each of them with a color chosen from a palette of 52 colors (Figure 1., all palette-related details are found in supplementary materials). This color palette has a variability of not only in terms of hue, it was used to make the task easier for the participants, although there are different more accurate color selection software in the literature. The participant pool comprised a total of 565 participants (all non-expert wine consumers), with 190 males and 375 females (mean age = 31.3 years old ± 10.7). By dividing the 52 colors into families, e.g. red, yellow, blue, and two families of achromatic colors, black and white; explicit associative categories were formed for color-adjective wine associations; complete results are presented in Figure 4. Some interesting evidences came up. For instance, in our broad sample, some adjective-color associations had a high percentage of associations in a specific color spectrum, such as the adjective "Acido" (Acid) being associated with three color families in the following order: Yellow-Green 34.6%, Yellow 27.88%, and Green 15.49%. The fact that these colors are close in the color spectrum suggests that these associations are even stronger than they may appear at first sight. Another example pertains the adjective "Biologico" (Organic), which is almost predominant in the wine market from 2020 onwards. The results showed that this adjective was strongly associated with color families close to each other in the color spectrum, such as Green, Yellow-Green, and Green-Cyan. Overall, these congruent categories of adjective-color associations are representative, but not all 56 adjectives have such significant associations (Figure 2). The use of a diverse color palette and its categorization into families allowed for a better understanding of color-adjective associations in the wine market, which has not been studied in such detail in previous marketing literature.

Fig. 1. Color sampled used.

Particularly, our research aimed to delve into the potential influence of color associations on the perception of wine consumers. More specifically, we sought to examine the hypothesis that color could serve as a means of expressing certain wine characteristics, and that these associations may have a bearing on consumer choices regarding which wine to purchase. To the best of our knowledge, this is the first available dataset on the association between color and wine's features in an Italian sample.

3. Study 2. Implicit study

Building on the results obtained from the previous questionnaires, which explored explicit associations between colors and wine-related adjectives, we were able to create congruent categories of stimuli (color-adjective pairings). We then proceeded to test these categories, both congruent and incongruent, in an implicit manner, in order to determine whether these categories also hold implicit associations. We sought to verify whether the color-adjective pairings that emerged from explicit associations between wine-related adjectives and colors would also be confirmed through implicit associations. To achieve this, we employed a testing method that would bypass conscious awareness and directly tap into implicit associations. Our findings will provide valuable insights

into the nature of the associations between colors and wine-related adjectives, shedding light on how these associations might shape our perception and evaluation of wine. For this purpose we used the Dot Probe paradigm (Cannito et al., 2023), modifying it ad hoc by using a textual prime that triggered a mental representation linked to the adjective prime (the 56 adjectives list) that was presented centrally on the screen and was followed by two sided color stimuli (the most chosen and a not-chosen color for each adjective). In congruent condition of the task, the dot to which the participants is asked to react by pressing a key is presented on the side of the most chosen color. Contrarily, in the incongruent condition the probe appears on the side of the not chosen color. Specifically, the prime (Adjective) was presented for 1500 ms. This was followed by a fixation cross (+) for 500 ms, and then pairs of color stimuli were presented for 1000 ms each (see Figure 3). The task lasted about 30 minutes and was administered online through the E-Prime GO platform (Psychology Software Tools, Pittsburgh, PA). Participants had a total of 224 trials, divided into 112 test trials (for which color stimuli included the most chosen and a not chosen color) and 112 control trials (for which color stimuli included the second most chosen and a not chosen color). Among all trials, color stimuli (chosen and not chosen) were balanced for right and left presentation, so participants saw the each adjective four times (2 times as control trial and 2 times as test trial). Thanks to this task, it is possible to measure Attentional Bias (AB) toward one of the two color after a specific adjective, which indicates an implicit preference toward one of the two colors.

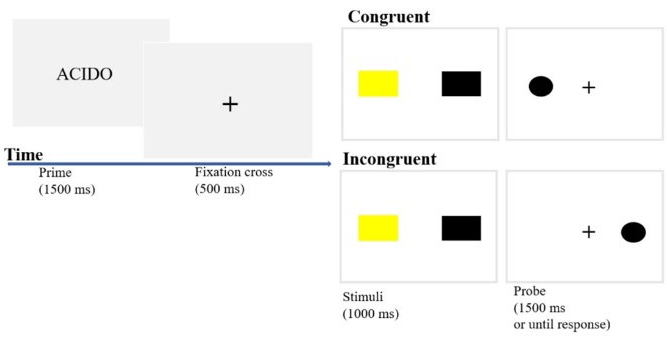

Fig. 2. Task.

The sample of participants in the experimental study were all volunteers and wine consumers, recruited through social media pages or acquaintances and was composed of 40 participants, divided into 28 female and 12 male participants. The average age of the sample was 27.1 years (with a standard deviation of 2.2 years). Participants reported no vision problems and completed the task in total silence and without distractions. The results of our study show that, with regard to accuracy, we did not find any significant differences between the congruent and the incongruent condition, with a percentage accuracy of 99.4% for congruent categories and 99.3% for incongruent categories (See Figure 3a).

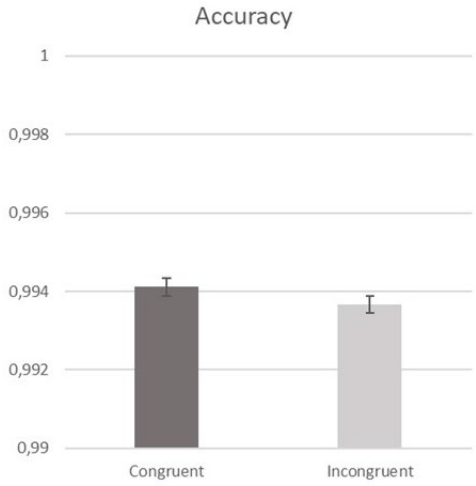

Fig. 3a. Results Mean Accuracy

On the other side, we found significant difference in reaction times (Figure. 3b), indicating that participants were faster to respond to the dot when the probe was presented behind the incongruent color (not chosen color), with an average response time of 331.46 ms for congruent categories and 316.11 ms for incongruent categories (p = .001).

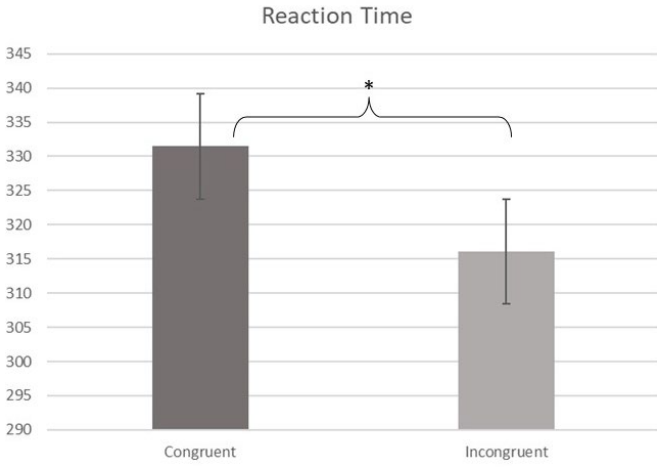

Fig. 3b. Results Mean Reaction Time.

4. Conclusion.

The findings of this study are in line with other studies on the subject (MacLeod et al., 1986). Due to the task simplicity and lack of distinctions that we expected to see, we did not discover any differences in accuracy for this assignment. When examining the variations in response times, an intriguing result demonstrated the existence of an attentional bias towards the incongruent stimuli. This

is widely explained in the literature as a form of inhibition of return (IOR), caused by the attentional capture of the congruent stimulus and the "inability" of the participant to refocus on the previously explored stimulus. More specifically, the "inhibition of return" (IOR) is defined as the poorer performance in previously signaled positions (Posner et al., 1985). The cause of IOR has been attributed to the attentional orientation towards a location and the subsequent disengagement of attention from that location. The effect has been to discourage attention from reorienting towards the originally frequented location.

5. General discussions.

Building on the results obtained from our two studies, the first of an explicit type (as done in traditional marketing), to better understand all the results look at Figure. 4, where the participants' favorite associations between color and adjective are shown in percentages; and the second more of an implicit type (carried out using techniques typical of psychology).Our work aims to optimize communication through careful use of color in the label; labels are a crucial element in wine marketing, as consumers often rely on images, layout, and color to infer the quality and personality of the wine brand (Verdu Jover et al., 2004; Boudreaux & Palmer, 2007). In fact, labels are the second most important predictor of a wine's purchase intention after price. Colors have meanings and are a fundamental tool in marketing strategies and communications, as they are often used for product and brand differentiation based on consumer perceptions. Therefore, packaging elements that quickly communicate the relevant and appropriate information about the quality of the wine become increasingly important marketing instruments (Nomisma, 2003).

The importance of color cannot be underestimated, as it plays a key role not only in conveying messages and emotions, but also in serving as a powerful tool for anticipating consumer preferences and behavior. As we have seen, the impact of color on human psychology and perception is a much-studied topic, and its influence on various aspects of our lives, including art, design, marketing and branding, is undeniable. In the field of communication, color is a powerful visual clue that can evoke different emotions and associations (Bortolotti et al., 2022), depending on the context and cultural background of the audience. However, the impact of color goes beyond communication, as it also influences consumer behavior and decision making. For example, studies have shown that people tend to prefer products and services that align with their preferred colors or color schemes, which can influence their purchasing decisions and brand loyalty. Similarly, some colors are associated with specific attributes and values, such as green with sustainability or black with luxury, which can influence how consumers perceive and evaluate a brand. In addition, color can be used to anticipate consumer preferences and trends by analyzing their expectations and cultural associations. By understanding the psychological and cultural significance of different colors, companies can adapt their products, packaging, and marketing strategies to appeal to specific audiences and differentiate themselves from competitors.

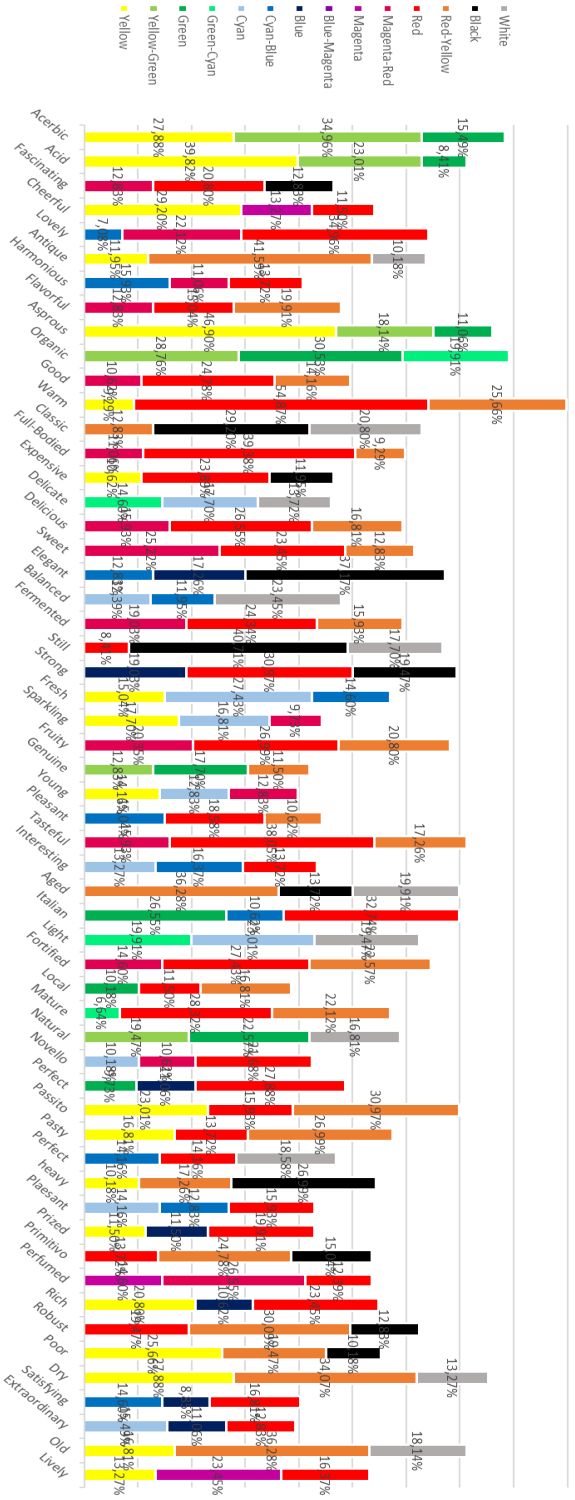

Fig. 4. Percentage of colors associated with each tested adjective.

6. Conflict of interest declaration

The authors received no specific funding for this work.

7. Funding source declaration

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

8. Supplementary materials

Color sample (Figure 1.) list number (HEX code): 1(#FE66B0), 2(#FF6666), 3(#FFB166), 4(#FFFF66), 5(#B3FF66), 6(#66FF66), 7(#FF007E), 8(#FE0000), 9(#FF7F00), 10(#FFFF00), 11(#80FF00), 12(#00FF00), 13(#980050), 14(#9A0000), 15(#994B00), 16(#404040), 17(#999A00), 18(#4D9A00), 19(#009900), 20(#660030), 21(#660000), 22(#663200), 23(#000000), 24(#656600), 25(#336600), 26(#006600), 27(#660066), 28(#330066), 29(#010066), 30(#FFFFFF), 31(#003466), 32(#026666), 33(#006633), 34(#990099), 35(#4C0099), 36(#000099), 37(#C0C0C0), 38(#004C99), 39(#009899), 40(#00996B), 41(#FF00FE), 42(#7F00FF), 43(#0000FE), 44(#0080FF), 45(#01FFFF), 46(#00FE80), 47(#FF66FF), 48(#B266FF), 49(#6665FF), 50(#66B0FE), 51(#99FFFF), 52(#99FFCD)

9. Short biography of the authors

Alessandro Bortolotti – Psychologist, he obtained his doctorate in Business and Behavioral Sciences at the University of Chieti-Pescara, where he studies neuromarketing and emotion using behavioral and neurophysiological methods.

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Stefano Anzani - Studied Psychology and Cognitive Neuroscience. He obtained her doctorate in Business and Behavioral Sciences at the University of Chieti-Pescara.

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