



Love at First Sight? The Influence of Color on Chocolate Purchase Intention Among Highly Sensitive People

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Abstract

Title: Love at First Sight? The Influence of Color on Chocolate Purchase Intention Among Highly Sensitive People

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Studies have shown that color can influence purchase intention for certain products, as in the case of chocolate. However, there is limited information regarding which specific colors are most effective in this context and how this effect can vary depending on the individuals' differences, such as the HSP trait, or even the level of arousal. Therefore, this paper aims to study how color combinations (complementary vs analogous colors) on chocolate packaging affect consumers' purchase intentions and examines whether HSP moderates and arousal mediates this relationship. To test these relationships, a quantitative study was conducted (N=206) through an online survey. The results revealed that specific combinations of colors, such as blue and orange, increase purchase intention. Although color combinations have no effect on arousal, a higher level of arousal generates purchase intention. However, there is no evidence that HSP moderates the relationship between color combinations and purchase intention. In conclusion, this study contributes to the literature on color and consumer behavior and offers implications for packaging design decisions in chocolate brands. Future studies could test stronger stimuli to affect arousal levels, HSP, and consequently, purchase intention.

Keywords: Complementary Colors, Analogous Colors, Food Packaging, Purchase Intention, Highly Sensitive Person (HSP), Arousal

Resumo

Título: Amor à primeira vista? A Influência da Cor na Intenção de Compra de Chocolate Entre Pessoas Altamente Sensíveis

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Estudos demonstraram que a cor influencia a intenção de compra de determinados produtos, como é o caso do chocolate. No entanto, existe pouca informação sobre as cores mais eficazes neste contexto e como este efeito pode variar de acordo com as diferenças individuais, como o traço de pessoa altamente sensível (PAS) ou mesmo o nível de excitação. Assim, este artigo pretende estudar como as combinações de cores (complementares vs análogas) das embalagens de chocolate afetam a intenção de compra, bem como examinar se tanto as PAS moderam e os níveis de excitação mediam esta relação. Assim, foi realizado um estudo quantitativo (N=206) através de um questionário online. Os resultados revelaram que combinações específicas de cores, como o azul e laranja, aumentam a intenção de compra. Embora as combinações de cores não tenham efeito na excitação, um nível mais elevado gera intenção de compra. Contudo, não há evidências de que PAS moderem a relação entre as combinações de cores e a intenção de compra. Concluindo, este estudo contribui para a literatura sobre a cor e o comportamento do consumidor, oferecendo implicações para as decisões de design de embalagens de marcas de chocolate. Estudos futuros poderão testar estímulos mais fortes para afetar os níveis de excitação, as PAS e, conseqüentemente, a intenção de compra.

Palavras-chave: Cores complementares, Cores análogas, Embalagem, Intenção de compra, Pessoa altamente sensível (PAS), Excitação

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1. Introduction

Color is part of the routine of everyone and can impact consumer perception, engagement, behavior, and even feelings (Amaro et al., 2022). Moreover, it particularly affects the emotional response of arousal (Huang et al., 2023; Walters et al., 1982). Color is also used in marketing as a technique to produce behavioral effects that reflect purchase attitudes (Martinez et al., 2021). The effect of color is formed in the way that findings from other fields cannot be assumed in the marketing context (White et al., 2021).

Brands are seeking for attention and attract the right consumer, and the visual elements of product packaging can increase the appeal of the packages to customers and influence their behavioral response (Amaro et al., 2022), such as arousal emotions (Huang et al., 2023). Therefore, research shows that people may react differently to similar stimuli depending on their personality traits (Ding, 2022), as in the case of Highly Sensitive People (HSP). Previous studies have already found differences between behaviors and reactions among Highly Sensitive People (HSP) and Non-Highly Sensitive People (NHSP) in ads (Amaro et al., 2022).

In the specific case of food products, packaging is the first interaction that consumers have with the products, and it influences the chances of purchasing intention, where chocolate packages are not an exception. Studies also reveal that color has a direct impact on consumer purchase behavior, especially for chocolate, when analyzing the food category (Vaishnavi et al., 2022). In fact, as chocolate is often consumed directly from the package, it is likely to increase the influence of visual aspects on consumer perception (Baptista et al., 2022).

This topic is particularly relevant as, in the moment of buying, the aesthetics of the product may influence it, given that 70% of all purchase decisions are made in store, even with a pre-prepared shopping list. (Martinez et al., 2021; Vaishnavi et al., 2022). It was observed that when consumers do fast product evaluations of the products, the color contributes about 90% to it, since it is one of the main attributes of visual communication, leading to 62%-90% of purchase decisions (Martinez et al., 2021).

The increasing options of goods available in shopping increases consumers' choices but intensifies competition between brands. Therefore, it is important for brands to differentiate their products, and the color of packaging is a strong characteristic to distinguish the product from competitors and play a role in self-promotion (Ding, 2022). In fact, colors can also affect individual's arousal (Walters et al., 1982), which further influences purchase intention (Huang et al., 2023). And, as one of the most consumed products, chocolate demonstrates the

importance of packaging in influencing consumer preferences and purchase decisions (Vaishnavi et al., 2022).

Packaging also generates consumers expectations, and if their expectations are confirmed by the sensory perception, consumers are likely to purchase the product again, making packaging a very important factor for food manufacturers, given the function of packaging to convey expectations of how the food will be sensory perceived (Gunaratne et al., 2019).

Regarding HSP, although research on that has increased significantly on this topic, their behavior towards the consumption of packaged goods still needs to be explored. The assumption that at least 20% of the population is highly sensitive implies great relevance to study this specific type of consumer (Amaro et al., 2022). Moreover, Sensory Processing Sensitivity (SPS) has implications for health, education, and work, and therefore needs to be studied further to improve well-being and life satisfaction while preventing disability among the highly sensitive population (Greven et al., 2019).

Therefore, the current study aims to provide further knowledge about highly sensitive people in the specific context of chocolate purchases, focusing on the package appeal depending on the combination of colors. Specifically, the current paper aims to study the influence that colors might have on purchase intention when products have complementary or analogous color combinations on their packaging, understand whether the purchase intention of sensitive consumers differs from the non-sensitive consumers, and test whether arousal influences the effect of color combinations on purchase intention. In this way, the findings may contribute to the literature review on the study of color combinations on chocolate packaging and consequent purchase intention, helping chocolate marketers understand how colors influence consumer decision-making and how to use color combinations effectively on their packages to attract the right customers to purchase and generate later loyalty to the product.

However, although previous studies have studied the topic of sensory marketing and Highly Sensitive Person trait, there remains a gap in the literature regarding how different color combinations, specifically complementary and analogous, affect food packaging evaluation and, consequently, purchase intention among HSP. Considering this identified gap, the following research question (RQ) is proposed.

RQ: How do Complementary Vs Analogous Colors Combinations on Chocolate Packaging Influence Purchase Intention among HSP, and what is the Role of Arousal?

Based on this research question, the following three research objectives (RO) were established to guide the study:

RO1: Study the effect of packaging with complementary and analogous color combinations on consumers' purchase intention towards chocolate.

RO2: Compare the differences in purchase intention between HSP and NHSP when exposed to complementary and analogous color combinations.

RO3: Test whether arousal mediates the effect of color combinations on purchase intention.

The following parts of this research work are divided into sections that include the literature review, with the main results of the existing literature on this field of study, followed by the hypotheses formulation and theoretical model. In the next sections is presented the methodology, the results and discussion of the results, which include also theoretical and practical implications, and limitations and suggestions for future research. At the end, the main conclusions of the study complete the analysis.

2. Literature Review

2.1 Sensory Marketing

Sensory marketing is based on sensations and perceptions that influence consumer buying behavior and their attitude towards brands, advertisements, and products. Sensory experiences involve all the five senses: sight, hearing, smell, touch, and taste. Therefore, sensory marketing can influence buying process by using sensory strategies which increase the relationship between consumers and brands. So, by using sensory cues it's possible to increase consumer interest, impulsion for purchasing behavior, and may even suppress rational thinking in consumers, dominating emotional responses (Amaro et al., 2022).

2.1.2 Colors

About 80% of what we assimilate through senses is visual, and 80% of the assessment of the surroundings is color-based (Ettis, 2017). So, visual communication, such as color, seems to have the most influential impact on consumer behavior (Martinez et al., 2021). The human perception is highly influenced by color, prioritizing it at 80% over shape when looking at objects (Su & Wang, 2024). It is already known that color influences emotional reactions and mood changes in individuals across different environments, as physical or online shopping, for example, and can even affect attitude and purchase intention (White et al., 2021). Colors can also influence customers' product choices, perceptions, and evoke consumers' willingness to buy a product, making color one of the frequently used marketing tools (Khan & Ali, 2024). According to the theoretical analysis of color perception on consumers, it is deduced that the preference for certain colors cannot be explained by gender or age (Vaishnavi et al., 2022).

Variations on hue (wavelength of a color in the visible light spectrum, for example, blue, red, or green), saturation (color intensity), and value (level of a color's darkness) can alter consumers' perceptions and preferences (Celhay & Luffarelli, 2024) (Celhay & Luffarelli, 2024). In particular, the level of saturation and brightness, the hue, and the color combination can also influence the consumers' attitude towards a product and create different emotions (Amaro et al., 2022). Previous studies also reveal that when exposed to autonomous colors, they can have different associations, for example, colors like white, yellow, and pink tend to be associated with sincerity, red with excitement, and black with sophistication (Khan & Ali, 2024).

Prior works identify that hues carry meanings that can be divided into two categories: embodied and referential. Embodied meanings are intrinsic to hue's inherent properties, while referential meanings are context dependent, emerging from associations that people develop due to repeated exposure to colors during their lives (Celhay & Luffarelli, 2024). The relationship between color and brand personality is an example of referential meanings, with colors serving as a valuable marketing tool in brand strategy, even that color perception has individual emotions associations depending on each individual history, personality, and past experiences. However, the context where the colors are applied, such as the type of product, also determines the colors' symbolic meaning (Martinez et al., 2021). Hues can also convey positive and negative meanings, as for example, in consumption and branding contexts, blue evokes competence and calmness but can also suggest sadness and fear (Celhay & Luffarelli, 2024).

Color can also be combined to influence the human behavior, and those combinations can be, for example, between complementary or analogous colors. Complementary colors refer to the colors located on opposite sides of one another in the color wheel, while analogous colors are located next to each other in the wheel (Martinez et al., 2021). When complementary colors are placed side by side, they create the highest contrast possible in perception and make colors more noticeable, whereas analogous color combinations are considered harmonious, more pleasing to the eyes, bring more positive attitudes for the viewer, and are not visually catching. Examples of complementary and analogous colors are red-green and red-orange, respectively (Martinez et al., 2021; White et al., 2021).

Another way to characterize colors is by distinguishing between warm and cool colors. Colors with long wavelengths, like yellow and red, are characterized as warm and perceived as arousing, while colors with short wavelengths, such as blue, green, and violet, are characterized

as cool colors and perceived as peaceful and calming, reducing feelings of anxiety and being more favorable (Broeder & van Doremalen, 2021).

2.2 The Influence of color on food packaging

Food package serves as a container, in order to keep it secure and fresh, but intends to explain also the value of the food and encourage customers to purchase it, affecting their decision-making process. (Khan & Ali, 2024). Therefore, packaging as becoming a tool of sales promotion, giving producers the last chance to increase purchase intention, considering that the customer is highly attracted to any new-looking object. So, it is affirmative that packaging can decide the success or failure of a product, also because when placed with several other products, packaging is the factor that attracts and differentiates the various products (Vaishnavi et al., 2022).

The package is one of the most appealing features and can be the main connection between a product and the customer, transmitting the qualities and benefits of the product (Martinez et al., 2021). When searching and buying any product, consumers are exposed to various stimuli, such as color, shapes, product types, background design elements, slogans, mascots, and characters (Amaro et al., 2022). Indeed, when brands are trying to stand out and increase brand recognition, they develop new packaging ideas, as one of the product strategies at the stores focuses on product communication (Martinez et al., 2021). In this case, package elements as sensory cues may attract customers' attention to a certain product, improve appearance, and change the consumer perception of the product (Khan & Ali, 2024).

When consumers are shopping, the first thing they observe is the color of the package, and a reasonable color combination can attract the attention of consumers first (Vaishnavi et al., 2022; White et al., 2021). People tend to prefer stimuli that are easier to process, that means when a product's design is congruent with the associations they already have, since this also facilitates the identification and search for the product in the marketplace, although it will be harder for the package to stand out on the shelf (Spence & Velasco, 2018). So, when designing the color of the packaging, the main color will be decided according to the content of the product, and the remaining colors should match the main one (White et al., 2021). In other words, color is used to communicate to the customer the information about the product's sensory properties, such as taste, or other broader abstract attributes, like premium, natural, or healthy (Spence & Velasco, 2018).

Focus on the color as a communication factor, it is also connected to the brand itself, obtaining symbolic meanings in the mind of potential consumers. The color of the packaging can also be influenced by the product category, due to cognitive associations, as functional

products are associated to blue and sensory or social products to red color, for example, food in red packaging is perceived as having a sweeter taste than food is in a blue package (Khan & Ali, 2024; Martinez et al., 2021). In fact, from an evolutionary psychological perspective, it has been noted that humans have progressively developed a preference for warm-colored foods (Su & Wang, 2024).

In terms of saturation and lightness of the colors, studies discovered that higher-saturation visuals persuade feelings of excitement, and higher color lightness induces feelings of relaxation. About color value, in the case of packaging, if it is dark (vs light) consumers view a product as being more durable, but less convenient. Regarding color contrast, the red-green axis reveals to be the most salient, while the blue-yellow is less so (Krishna et al., 2017).

Studies suggest that certain combinations of colors may imply a particular product attribute more effectively than any single color. However, when these colors are arranged side-by-side instead of foreground-background layout, people find it harder to associate them with a taste. Thus, color plays an important role in capturing attention in the shop aisle, moreover, distinctive colors and color schemes can also serve as a valuable brand asset (Spence & Velasco, 2018).

2.3 Color Packaging and Purchase Intention

Marketing has gained greater importance in identifying consumers' wants and needs, as they are more sophisticated, complicated, and demanding. Consumer behavior is influenced by many attributes, such as psychological, which may determine what drives purchase intention (Amaro et al., 2022). Consumers also tend to rely on intuition rather than rational analysis in their decision-making processes, as the increasing amount of information in the environment makes it difficult to make optimal or even satisfactory decisions (Malewska et al., 2024).

In everyday shopping for food and beverages, consumers just spend around one-third of a second looking at each product in the point of sale, and their purchase decision is based on extrinsic product characteristics and appearance (Beneke et al., 2015; Gunaratne et al., 2019). There is a difference in how consumers perceive intrinsic and extrinsic product cues, as intrinsic cues (like flavor, aroma, texture) are associated with sensory and perceptual systems, while extrinsic cues (like packaging material, information, brand name, price) are processed through cognitive and psychological mechanisms (Gunaratne et al., 2019).

Packaging can contribute to the multisensory experience of consumption from the moment the consumer inspects it on the shelf to the eventual disposal. That contribution is mainly from the visual aspect, like colors, images, typefaces, and shapes, which was shown to influence people's preferences, expectations, and perceptions (Baptista et al., 2022). In the case

of snack food packaging, it has been described as generating a positive response from potential buyers (Khan & Ali, 2024).

Therefore, aesthetics strongly influences consumers' decision making, with eye-catching designs and colors impacting purchase intention. In fact, customers tend to choose products whose packaging colors attract their attention, and color novelty in packaging has also been shown to increase purchase intention (Khan & Ali, 2024; Martinez et al., 2021). Color scheming is the first attribute of the product that the consumer's brain registers, even before typography or images (Beneke et al., 2015). Moreover, various research shows that when color cues are incorporated into product packaging, they can help set people's sensory and hedonic expectations for the product (Spence & Velasco, 2018).

Researchers show that color can certainly affect consumers' purchase behavior, as consumers carry associations that can lead to purchase behavior. There are two types of purchasing behavior: impulse buying (referred to unplanned purchases) and Brand Loyalty (when consumers recognize a need and choose to acquire a preferred brand). Both are influenced by the color of the packaging, but studies suggest that impulse buyers respond positively to colors of red, orange, black, and royal blue, while consumers who demonstrate brand loyalty respond positively to pink, light blue, and navy (Beneke et al., 2015).

The packaging can be divided into two main types: purchase packaging and consumption packaging. The purchase packaging (outer packaging) mostly affects consumers at the time of purchase, while consumer packaging (inner and/or intermediate packaging) affects consumers more at the time of consumption. In this way, the purchase packaging is of great importance as a point of contact between the customer and the firm, with implications for generating attention (Krishna et al., 2017).

2.4 Chocolate Packaging and Purchase Intention

Visual information, like color, influences directly the purchase behavior of a consumer, especially for chocolate than other products in the food category (Vaishnavi et al., 2022). Chocolate is a food-related product, frequently desired globally, being considered by some people as hedonic spending, and for others can be a sensible choice related to their cognitive function, but it is not a need or necessity, as most of these customers make the purchase decision on the shop shelves (Khan & Ali, 2024; Vaishnavi et al., 2022).

Although the main function of the packaging is to protect the product, it can also work as a promotional tool, especially in the food industry, where packaging of food products, like chocolate, can market their selves (Vaishnavi et al., 2022). Also, in the specific competitive landscape of chocolate, marketers must differentiate through the visual clutter of brands to

successfully sell their products, with color serving as a powerful tool (Beneke et al., 2015). However, they must consider that consumers tend to associate the chocolate packaging with flavor and the qualities of the product (Khan & Ali, 2024), and that chocolate is considered both a sensory and social product, and those types of products are often more suitably associated with red and orange colors (Martinez et al., 2021).

Studies on packaging choice depending on the color of the retail environment reveal that, for chocolate, in a blue store, red and orange colors are preferred and tend to drive purchase intention. Among other trials on combinations of colors, the study concluded that the complementary color contrast (or almost, in the case of red and blue) increases attractiveness and purchase intention for chocolate (Martinez et al., 2021).

A study from Khan and Ali (2024) found that exists significant effects of packaging color on customers' willingness to buy chocolates, with purple and red color packages more attractive than yellow.

The study of Beneke et al. (2015) which aimed to determine the effect of packaging color on stimulating chocolate purchase intention in terms of impulse and planned purchases, concludes that what works for spontaneous responses, appears to be also effective in the case of brand loyalty, with purple as the most attractive color, followed by red, blue, and orange as least influential.

Other study, from Su and Wang (2024), analyzed the interaction of food type and package color on consumer purchase intention and their results shown that warm packaging is more likely to increase purchase intention for vice foods (delicious and unhealthy, such as chocolate), and cold package is more likely increase purchase intentions for virtue foods (less tasty but healthy, such as vegetables salads).

2.5 Arousal response to color

Environmental stimuli directly affect organisms and influence their behavioral response (Amaro et al., 2022). One emotional response is arousal, a subconscious emotional state that can be characterized as the process of moving from calm to excitement and stimulation (Huang et al., 2023).

The arousal felt by individuals can be affected by colors, with some making them feel more aroused and others making them feel more relaxed. The preference for a given color, as well as color choice at a given moment, would also act as an indicator of the preferred level of arousal at that time (Walters et al., 1982).

In a study from Küller et al. (2009), the experiment comparing a colorful and a gray room indicates higher arousal response to high visual complexity, with colors and patterns being

more stimulating. In terms of food advertising, visuals with higher levels of complexity generate more pleasure and arousal, and that complexity is appreciated by high sensation seekers (Amaro et al., 2022).

Consumers' arousal emotions can be enhanced by social cues, in retail scenarios, and positively influence the midstream experiences, which further influence their purchase intention (Huang et al., 2023). In the case of dynamic imagery, for example, it can generate other reactions beyond the initial arousal response, such as purchase intention, with greater levels of arousal resulting in greater purchase intention (Fennell & Schneider, 2023).

2.6 The Highly Sensitive Person Trait

External stimuli can be perceived differently by different individuals. In the case of Highly Sensitive Person (HSP), they tend to pay more attention to detail and be more aware and vulnerable to environmental stimuli (Amaro et al., 2022). Sensory Processing Sensitivity (SPS) describes inter-individual differences in trait sensitivity to experiences (Greven et al., 2019), being defined as a personality trait and not an illness, even that HSP may be interpreted as shyness, weakness, or even unsociability (Amaro et al., 2022).

The Highly Sensitive Person (HSP) trait is defined by Sensory Processing Sensitivity (SPS) and translates it into high emotional sensitivity, deeper reactivity to external and internal stimuli and a complex inner self. Studies concluded that HSP have an increased sensitivity of the central nervous system to physical, emotional, and environmental stimuli (Amaro et al., 2022), thus, HSP perceive stimuli with very low levels of sensory input but do not aim to avoid the high sensory stimulation that overwhelms them (Naish & Harris, 2012).

Highly sensitive individuals tend to engage in deep information processing, paying attention to subtle nuances and casual relationships, allowing them to sense situations, emotions, and the potential outcomes for actions, which influence their intuition. HSP use intuition very often in their actions, sensing the non-obvious details of decision-making situations, and, when analyzing and summarizing a large amount of information, they notice things that are not perceptible to others, such as details and differences, and tend to analyze and reflect carefully (Malewska et al., 2024).

The SPS theory also proposes that more sensitive individuals experience strong effects and responsivity to both negative and positive environmental conditions and stimuli (Greven et al., 2019). In this way, it is believed that HSP are more likely to be overwhelmed and become uncomfortable with different lights, colors, sounds, or certain bodily sensations (Amaro et al., 2022)

Based on past research, HSP can be characterized as more sensitive and reactive to slight contrast colors, sound, and textures, given that they absorb almost everything that is unnoticed or seems ordinary to others. Indeed, strong lights and colors, or loud music, can be hyperstimulating and even overwhelming to HSP (Amaro et al., 2022). A study in a laboratory found that individuals with high SPS exhibit greater changes in positive affect, compared to those with low SPS, when exposed to a positive mood induction video-clip (Greven et al., 2019). Therefore, it can be stated that when facing the same stimulation, the degree of arousal between HS and non-highly sensitive (NHS) person differs significantly (Amaro et al., 2022).

In the research by Amaro et al. (2022), which focused on how contrasting ads characteristics affect the attitude of respondents, and how does it changes among HS and NHS person. They conduct two studies using different stimuli that influence in visual characteristics: Dynamic vs. Static; Complex vs. Minimalist; and Chromatic vs. Achromatic. In the first study, participants evaluated their attitude toward the ad after exposure, while in the second study, researchers assessed the biometric responses through neurofeedback to capture consumers' reactions beyond self-reports. The results obtained from both studies were aligned for the Dynamic vs. Static and Complex vs. Minimalist characteristics. In the first study, HS respondents had a more prominent decrease in their attitude towards the dynamic and complex ad, like in the second study, where they revealed higher tension and greater difficulty in capturing the information displayed by the dynamic ad, and peaks of anxiety and initial tension when facing the complex ad. For the last characteristic (chromatic vs achromatic), the studies had different results. In study 1, the difference between NHS and HS is much lower, with both groups showing a positive attitude towards the chromatic ad. However, in study 2, HS respondents experienced a few apprehension problems on the chromatic ad when comparing with the achromatic ad, which caused some peaks of tension and stress. Therefore, they concluded that HSP presents a higher negative attitude towards more stimulating ads (Amaro et al., 2022).

In the already existing literature that relates sensory sensitivity and eating behavior, it associates sensory sensitivity with selective eating in children, believing that highly sensitive children avoid many fruits and vegetables due to their intense perception of the varied tastes and textures of those foods. It is proposed that the perceptible food sensory properties may make some foods more aversive or more desirable due to their high responsiveness to those properties (Naish & Harris, 2012).

2.7 Hypotheses Formulation and Conceptual Model

Considering all the previous research and studies, the current study pretends to answer the research question by testing the following hypotheses, which were created based on the literature review.

The first hypothesis is based on the study of Martinez et al. (2021), which observes that complementary color contrast between the product and the environment increases purchase intention for chocolate. Although the present study does not rely on foreground-background analysis, but on the contrast side-by-side in the chocolate packaging. Other researchers, as Khan and Ali (2024), affirm that customers frequently choose products whose colors catch their attention, which is not the case with analogous colors, which are not visually catching (Martinez et al., 2021). Therefore, the following hypotheses are formulated:

H1: Different packaging color combinations influence purchase intention.

H1a: Chocolate packaging with complementary color combinations generates higher purchase intention than packaging with analogous colors.

For the second hypothesis, it was based on studies from Amaro et al. (2022), Greven et al. (2019), and Naish and Harris (2012), which found that HSP perceive stimuli with very low levels of sensory input and tend to engage in deep information processing, experiencing strong responsivity to both negative and positive environmental stimuli. Amaro et al. (2022), also noted that HSP are more reactive to slight contrasts colors and are more likely to feel overwhelmed and uncomfortable with different colors.

H2: The effect of different packaging color combinations on purchase intention is moderated by the HSP trait.

Finally, the third hypothesis was created based on the fact that arousal responds to color stimuli (Walters et al., 1982), with its level differing according to the complexity of that stimulus (Amaro et al., 2022), and influencing the purchase intention (Huang et al., 2023). As some color combinations can be more contrasting (complementary) or harmonious (analogous) (Martinez et al., 2021; White et al., 2021), they may be perceived as more or less complex. So, this leads to the formulation of the following hypothesis:

H3: The effect of different packaging color combinations on purchase intention is mediated by arousal.

Based on the above hypotheses, figure 1 presents the theoretical model:

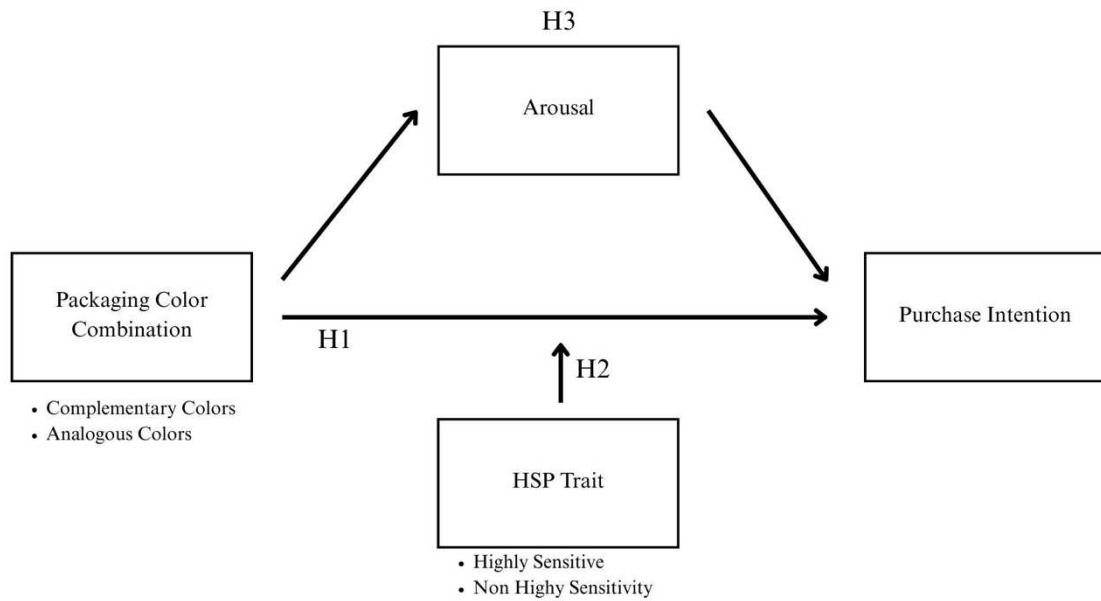


Figure 1 - Theoretical Model

3. Methodology

The present study aims to measure the influence of complementary versus analogous combinations of colors on chocolate packaging on the purchase intention, considering the mediating role of arousal among HSP. Therefore, the independent variables are the packaging color combinations (red-green and blue-orange as complementary, and red-orange and blue-green as analogous combinations of colors), the dependent variable is purchase intention, the mediator is arousal, and the HSP trait is the moderator. This research uses a quantitative experimental design, implemented through an anonymous online survey.

Regarding combination of red-green as complementary combination colors and red-orange as an analogous colors, the red color was carefully chosen as sensory products are associated with red, with food in red packaging being perceived as tasting sweeter (Khan & Ali, 2024; Martinez et al., 2021), and due to a higher willingness to buy chocolates with red color package (Khan & Ali, 2024). The red-green combination was chosen for its high salience (Krishna et al., 2017), and the red-orange combination due to consumer preference for orange among impulse buyers, even if less influential, it still influences chocolate purchase intention (Beneke et al., 2015). Additionally, the combinations blue-orange and blue-green were also created to test, at least, one more combination of each complementary and analogous group, respectively, in order to validate the applicability of the results.

3.1 Procedure

To proceed with the study, it uses a quantitative approach through an online questionnaire created on the Qualtrics platform and shared mainly through social media

platforms during the first twenty days of November 2025, with the aim of obtaining a high and diverse number of responses. Before launching the survey, 13 pilot tests were conducted to ensure the best versions were distributed to the public and with no mistakes. In this way, the questionnaire follows a between-subject design, consisting of four versions. All versions include the same questions, consent formulary, and demographic questions, but differ in the image of the chocolate packaging, with two versions for complementary, red-green and blue-orange, and two other versions for analogous, red-orange and blue-green, with the HEX codes #8F0700 for red, #4C9166 for green, #B54800 for orange, and #21888F for blue. These images were created for the purpose of study using ChatGPT artificial intelligence to generate them, and the Playground AI design tool to manipulate (*Figures 2, 3, 4, and 5*).



Figure 4 - Packaged Colored with red and green Complementary Colors



Figure 5 - Packaged Colored with blue and orange Complementary Colors



Figure 3 - Packaged Colored with red and orange Analogous Colors



Figure 2 - Packaged Colored with blue and green Analogous Colors

The questionnaire includes 8 blocks. In the first one, it presents the introduction which explains to the participants the aim of the study and inform regarding the confidentiality and anonymity of their responses. Participants are just required to provide informed consent to proceed with the questionnaire.

As fundamental for the reliability of the study, a color-blindness test is performed on the second block, using the color vision test of 8 plates, from Waggoner, 2022. Participants who answered incorrectly two or more numbers are considered to have potential color vision deficiencies, and their answers will be excluded from the study (Ishihara, n.d.).

On the third block, participants face a short explanation regarding what is going to happen next, including their exposure to one image of a colored chocolate package, followed by a short questionnaire about it. Here, they are also recommended to proceed to some actions on a mobile phone to have a better experience while realizing the questionnaire.

The fourth block shows one of the four versions to each participant, to avoid biased responses, with images being presented randomly and evenly. Still on this block, participants

will face the assigned chocolate packaging image and three questions. The first question is regarding purchase intention, which main goal is to test the hypothesis regarding the influence of complementary and analogous colors on purchase intention. Then, participants have an attention check question to verify whether they are paying attention to the questionnaire by identifying the colors shown on the chocolate packaging they saw. Last question, still on this block, aims to analyze participants' arousal level.

In the fifth block, the goal is to verify the perception of realism of the images, so participants are asked to indicate their perceived realism of the chocolate bar packaging on a 7-point Likert scale, ranging from 1 = nothing realistic to 7 = totally realistic. Responses from 1 to 3 will be considered low realism, while responses from 4 to 7 will be considered high realism. When analyzed, these will be coded as 0 and 1, respectively (Martinez et al., 2023).

The sixth block is to analyze the HSP trait, identifying if the person is highly sensitive or not.

Block seven intends to gather information that may influence the participants' responses beyond the color combination, such as their involvement with chocolate, current hunger level, and color preferences.

Lastly, on block eight, participants are asked to answer demographic information questions, such as gender, age, nationality, etc.

3.2 Measures

The questionnaire aims to analyze and confirm the created hypotheses, and to do it, scales were needed to measure the variables.

To test the hypotheses regarding influence of complementary and analogous colors on purchase intention, participants needed to answer to "Now how likely is it that you, yourself, would purchase this product?" and complete with options ranged from "definitely will not buy" to "definitely will buy", using a 5-point Likert type scale (Mullet & Karson, 1985).

Participants' arousal level, measured in the last question from the fourth block, asks "How excited, stimulated, or alert did you feel while viewing the chocolate package? Please select the image that best represents how you felt.". This measure was assessed using the self-assessment manikin (SAM) scale, a picture-oriented instrument originally created by Bradley and Lang (1994) to evaluate pleasure, arousal, and dominance associated in response to an object or event, through a 9-pointing scale, from "Calm" to "Excited" (Bradley & Lang, 1994). The present questionnaire only uses the images from the arousal dimension of the SAM, specifically from the version presented by Lima et al. (2024). This version shows 9 figures that illustrate the range from calm to excited (Figure 6).

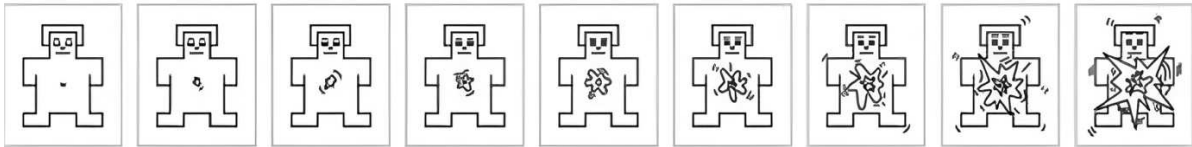


Figure 6 - Self-Assessment Manikin (SAM) – Arousal Dimension (1 = Calm, 9 = Excited). Adapted from Lima, R., Chirico, A., Varandas, R., Gamboa, H., Gaggioli, A., & i Badia, S. B. (2024). Multimodal emotion classification using machine learning in immersive and non-immersive virtual reality. *Virtual Reality*, 28(2).

<https://doi.org/10.1007/s10055-024-00989-y>

The moderator variable HSP trait is assessed on the sixth block using the Highly Sensitive Person (HSP) scale of Pluess et al. (2023) with 12 items that were developed from the original 27-item scale of Aron & Aron (1997). All these items use a 7-point Likert scale, with 1 being “Not at all” and 7 being “Extremely”. Respondents will be considered Highly Sensitive when their average of the 12 questions scores 5 points or higher on the scale (Amaro et al., 2022).

Table 1 - Summary of Variables, Scales, and Authors

Variable	Scale	Authors
Purchase Intention	5-point Likert Scale From 1 = “Definitely will not buy” to 5 = “Definably will buy”	Mullet & Karson, 1985
Arousal	9-point Likert Scale 9 Picture-oriented from “Calm” to “Excited”	Bradley & Lang, 1994
HSP Trait	7-point Likert scale From 1 = “Not at all” to 7 = “Extremely”	Pluess et al., 2023

3.3 Sample

In total, 242 responses were collected, however, 36 participants were excluded due to missing values (30), non-authorized responses (2), and failure answers in colorblindness tests (4). Although 13 participants selected an option in the attention check question that did not match the color of the image they viewed, they were not excluded from the analysis because removing them did not affect the results. It is possible that these participants were simply less attentive or had greater difficulty with visual memory.

Thereby, the final sample is composed by 206 valid responses, from which 80.6% considered the images highly realistic, while 19.4% considered them low realistic. This sample of 206 can also be divided according to the observed packaging: 53 for the red and green package; 52 for the red and orange package; 50 for the blue and orange package; and 51 for the blue and green package.

The survey was distributed to a variety of nationalities, with Portuguese as the majority (90.8%), but also including people from Angola, Argentina, Austria, Brazil, Canada, China, France, Germany, Iceland, Italy, Spain, and United States of America. The predominant gender was female (71.8%), contrasting with male gender (27.7%) and other (0.5%). The participants' ages start on 18, with 4 people more than 65, and prevalence for people between 18 to 24 years old (44.7%), followed by 45 to 54 (26.2%). Within the participants, more than half have a bachelor's or master's degree (75.3%). Regarding the working status, 50% are just working, 27.2% are studying, and 15.5% are working students. Lastly, people with highly HSP trait represent 54.4% of the total sample. A summary of the sample characteristics is shown in table 2.

Table 2 - Sample characteristics (N = 206)

Variable	Category	n	%
Nationality	Portuguese	187	90.8
	Other	19	9.2
Gender	Female	148	71.8
	Male	57	27.7
	Other	1	0.5
Age	18-24	92	44.7
	25-34	29	14.1
	35-44	13	6.3
	45-54	54	26.2
	55-64	14	6.8
	65+	4	1.9
Education Level	Bachelor's degree	78	37.9
	Master's degree	77	37.4
Working Status	Student	56	27.2
	Employed	103	50
	Working Student	32	15.5

HSP Trait	Non-Highly Sensitive	94	45.6
	Highly Sensitive	112	54.4

Finally, to be able to analyze this data and proceed with the treatment, the answers obtained from Qualtrics were exported to Excel, coded, and exported again to SPSS.

4. Results

The data was analyzed using statistical methods to identify relationships and trends among the four different color combinations on chocolate packaging and purchase intention, and also the effect of arousal and HSP trait on that relationship.

Before conducting the statistical analysis, the dataset was screened and prepared in Excel. This included the exclusion of incomplete, non-authorized, and incorrect answers. At this stage, the questionnaire items were coded, and, because the survey used four different blocks to show each participant only one of the four packaging images, the responses for purchase intention had to be consolidated into a single variable. The same was applied to arousal and attention check items. Additionally, a new computed variable was created by averaging all HSP trait items (AVG_H) to obtain each participant's overall HSP score and code it into Non-Highly Sensitive or Highly Sensitive (AVG_H_C).

Afterwards, on SPSS, statistical analyses were conducted, which included descriptive statistics, ANOVA, T-tests, PROCESS Model 1, linear regression, and PROCESS Model 4. A new variable was also created to combine the responses of people exposed to each type of packaging color combination (ColorTP), which was coded as 0 for people who saw analogous combinations (red-orange, blue-green) and as 1 for people who saw complementary combinations (red-green, blue-orange).

4.1 Internal Consistency of Variables (Cronbach alpha)

According to the variables of this study, only the HSP trait has more than one item to measure the same construct, having 12 items. Therefore, to study its internal consistency, Cronbach's alpha must be observed. Running a reliability analysis, it showed that the value of alpha is $\alpha=0.722$, which is acceptable for this study, and indicates that the items consistently measure the same idea.

4.2 Testing H1 "Different packaging color combinations influence purchase intention."

A one-way ANOVA with packaging color combination (red and green vs. red and orange vs. blue and orange vs. blue and green) as independent variable and purchase intention as dependent variable revealed, through the Levene's test, that the variance of the responses

was homogeneous (Levene=2.062, $p=.106$), allowing for the interpretation of the ANOVA F-test. The results showed that there are significant statistical differences in purchase intention between the four packaging color combinations and that the packaging color combination accounted for 6.2% of the variance in purchase intention. ($F(3,202)=4.458$, $p=0.005$; $M_{\text{red-green}}=2.74$, $SD=0.944$); $M_{\text{red-orange}}=3.19$, $SD=1.121$; $M_{\text{blue-orange}}=3.34$, $SD=1.126$; $M_{\text{blue-green}}=2.76$, $SD=0.907$; $\eta^2=0.062$). Post-hoc Tukey tests indicated that only blue and orange packaging color combinations generated significantly higher purchase intention compared to red and green ($MD=0.604$, $p=.017$) and blue and green ($MD=0.575$, $p=.028$). Therefore, H1 is supported.

4.2.1 Testing H1a “Chocolate packaging with complementary color combinations generates higher purchase intention than packaging with analogous colors.”

An Independent Sample T-Test was conducted to compare the purchase intention between the packaging with complementary and analogous color combinations (ColorTP, with 0=Analogous, 1=Complementary). The Levene’s test for equality of variances indicates that there is homogeneity of variances ($F(1,204)=0.109$, $p=.742$). The results also showed that there is no statistically significant difference between complementary ($M_{\text{Complementary}}=3.03$, $SD=1.080$) and analogous ($M_{\text{Analogous}}=2.98$, $SD=1.038$) color combinations, $p=0.743$ (two-tailed), with a very small effect size ($|Cohen’s\ d| = 0.046$). Consistent with this, the mean difference was minimal ($MD = 0.049$, 95% CI $[-0.340, 0.242]$), which supports the conclusion that there is no meaningful effect on purchase intention. Thus, H1a is not supported.

4.3 Testing H2 “The effect of different packaging color combinations on purchase intention is moderated by the HSP trait.”

The PROCESS Model 1 was used to run a moderation analysis, with the color type of packaging combination (ColorTP) as the independent variable, purchase intention as the dependent variable, and HSP trait (AVG_H) as the moderator. An initial analysis of the interaction effect between packaging color type and HSP trait, revealed that it was not significant ($b=-0.0164$, $SE=0.2016$, $t=-0.0815$, $p=.9351$), which means that the effect of packaging color type combination does not differ across the different levels of HSP. On a subsequent analysis, it indicated that neither the main effect of color type ($b=0.0458$, $p=.7594$) nor the main effect of HSP trait ($b=0.0759$, $p=.5842$) was significant (table 18). Therefore, H2 is not supported.

4.4 Testing H3 “The effect of different packaging color combinations on purchase intention is mediated by arousal.”

The PROCESS Model 4 was used to run a mediation analysis, with the color type of packaging combination (ColorTP) as the independent variable, purchase intention as the dependent variable, and Arousal as the mediator. Analyzing the effects of packaging color type on arousal, it was found to be not significant ($b=0.2718$, $SE=0.2558$, $t=1.0691$, $p=.2891$). The effect of arousal on purchase intention is significant ($b=0.1475$, $SE=0.0392$, $t=3.7676$, $p=0.0002$), which means that arousal predicted purchase intention. Lastly, the direct effect of packaging color type on purchase intention was not significant ($b=0.0084$, $SE=0.1434$, $t=0.0588$, $p=.9531$), and the indirect effect was also not significant since its confidence interval includes 0 (effect= 0.0401 , BootSE= 0.0404 , 95% CI [-0.0351 , 0.1272]), indicating that packaging color type doesn't affect purchase intention through arousal. Thus, H3 is not supported.

A summary of the hypothesis results is shown in table 3.

Table 3 - Summary of the results

Hypothesis	Relation Proposed	Statistical Test	Conclusion
H1	Packaging Color Combination → Purchase Intention	One-way ANOVA	Supported
H1a	Complementary Vs. Analogous → Purchase Intention	Independent Sample T-Test	Not supported
H2	HSP Trait Moderates: Color Combination → Purchase Intention	PROCESS Model 1	Not supported
H3	Arousal Mediates: Color Combination → Purchase Intention	PROCESS Model 4	Not supported

4.5 Complementary Analysis

Descriptive Analysis

In order to clarify the distribution of the sample in terms of HSP trait and arousal, the following descriptive analyses were conducted, as well as graphics to better visualize those results.

A descriptive analysis was conducted to analyze the distribution of the HSP trait. The results presented a mean of 4.5 on a scale from 1 to 7, a small standard deviation of 0.74, and a

small range (minimum = 2.00; maximum = 6.42). Here, it is possible to conclude that the sample is homogeneity in terms of the sensibility trait.

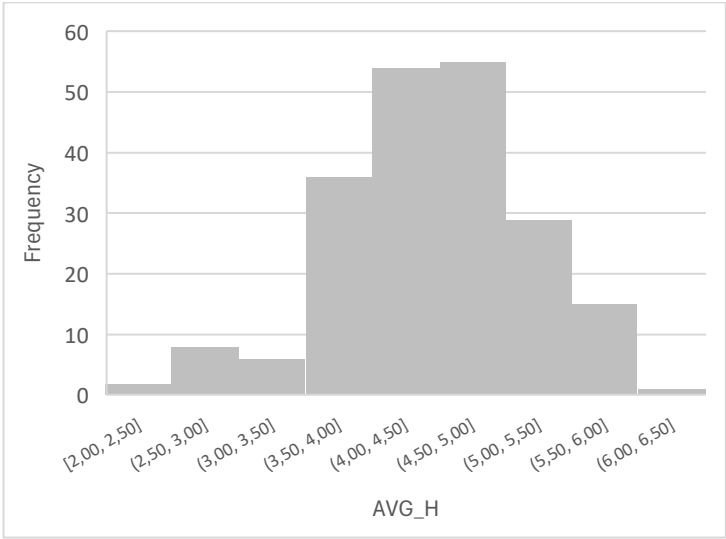


Figure 7 - Distribution of the HSP Trait

In terms of arousal, the same test was conducted and revealed a mean of 2.93 on a scale from 1 to 9, a standard deviation of 1.84, and a range from a minimum of 1 and a maximum of 9. These results show that the stimulus, the packaging color combinations, didn't generate high levels of arousal in the participants of this study.

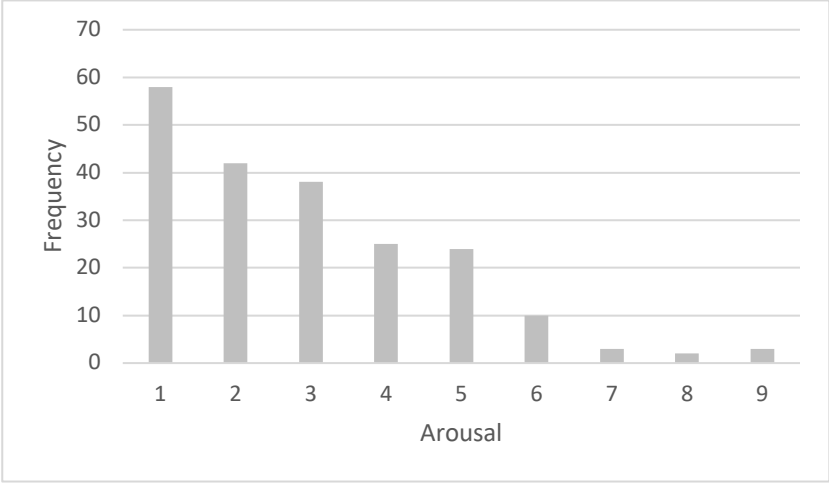


Figure 8 - Distribution of the levels of Arousal

To confirm that participants were equally distributed in terms of HSP trait across the four images packaging color conditions, a one-way ANOVA was conducted with the four conditions of packaging color combinations as the independent variable and HSP trait (AVG_H) as the dependent variable. Through the Levene's test, it revealed that the variance of the responses was homogeneous (Levene=0.693, p=.557) allowing for the interpretation of the Anova F-test which showed that there were no statistically significant differences between the four packaging colors combinations (F(3,202)=0.314, p=0.815; $M_{red-green}=4.469$, $SD=0.706$);

$M_{\text{red-orange}}=4.516$, $SD=0.817$; $M_{\text{blue-orange}}=4.577$, $SD=0.687$; $M_{\text{blue-green}}=4.444$, $SD=0.747$; $\eta^2=0.005$). Thus, these results confirm that the randomization was successful, and the four groups equally distributed in terms of HSP trait.

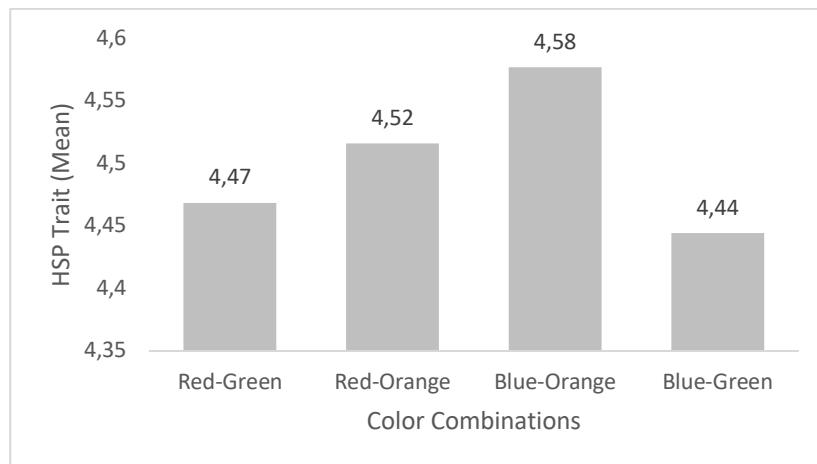


Figure 9 - Mean of HSP across the four Packaging Color Combinations

Another one-way ANOVA with the same four conditions of packaging color combinations as independent variable, but with arousal as dependent variable, was conducted to examine whether the four groups generated different levels of arousal among participants. Through the Levene's test, it revealed that the variance of the responses was homogeneous (Levene=0.543, $p=.653$) allowing for the interpretation of the Anova F-test which showed that there were no statistically significant differences in the arousal between the four packaging colors combinations ($F(3,202)=1.345$, $p=0.261$; $M_{\text{red-green}}=2.77$, $SD=1.948$); $M_{\text{red-orange}}=2.85$, $SD=1.984$; $M_{\text{blue-orange}}=3.38$, $SD=1.783$; $M_{\text{blue-green}}=2.75$, $SD=1.573$; $\eta^2=0.020$). Thus, these results showed that the combination of colors did not generate significant differences in terms of arousal.

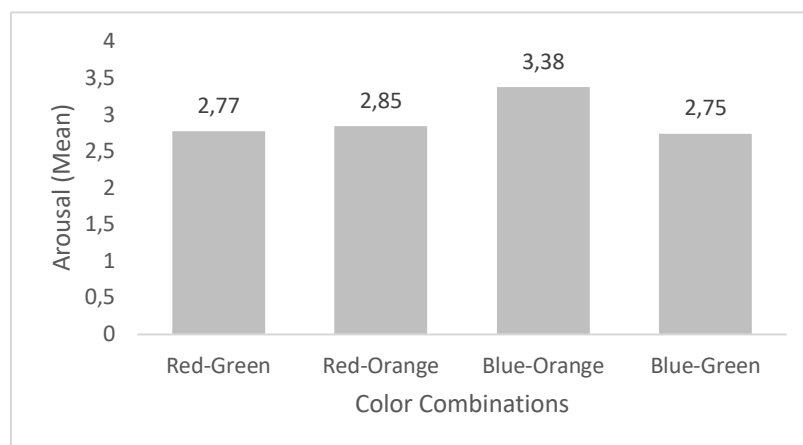


Figure 10 - Mean of Arousal across the four Packaging Color Combinations

Exploratory Analysis

As the analysis of the hypotheses revealed an association between arousal and purchase intention, two exploratory analyses were conducted to, first, clarify the relationship between HSP trait, arousal, and purchase intention, and then test an alternative model to determine if arousal could predict purchase intention and if this relationship depends on HSP trait while controlling for color conditions.

A Pearson correlation analysis was conducted to better understand the relationship between the three variables of the model: HSP trait (AVG_H), arousal, and purchase intention (PI). The analysis revealed that neither the correlation between HSP trait and arousal ($r=.072$, $p=.305$) nor HSP trait and purchase intention ($r=.049$, $p=.489$) was significantly correlated. However, arousal and purchase intention present a positive significance correlation ($r=.257$, $p<.001$), meaning that participants who experienced higher levels of arousal tended to increase their purchase intentions.

An additional exploratory analysis to test a new moderation model was conducted. It aimed to examine whether the relationship between arousal and purchase intention depends on the HSP trait while controlling for the two types of packaging color combinations. To explore this model, three analyses were run:

First, a simple linear regression was performed as a baseline test to examine the relationship between arousal and purchase intention, with arousal as the independent variable and purchase intention as the dependent variable, without considering other variables. The results showed that the regression was significant ($F(1,204)=14.376$, $p<.001$) and higher levels of arousal significantly led to a higher purchase intention ($b=0.148$, $SE=0.039$, $t=3.792$, $p<.001$).

Then, the PROCESS Model 1 was conducted with arousal as the independent variable, purchase intention as the dependent variable, and HSP trait (AVG_H) as the moderator. Although the effect of arousal on purchase intention remained significant ($b=0.1470$, $SE=0.0462$, $t=3.1835$, $p=.0017$), the effect of HSP trait on purchase intention ($b=0.0303$, $SE=0.1025$, $t=0.2958$, $p=.7677$) and the interaction between arousal and HSP trait ($b=-0.0581$, $SE=0.0748$, $t=-0.7770$, $p=.4381$) revealed not to be significant. Therefore, it is possible to conclude that the HSP trait does not moderate the relation between arousal and purchase intention.

Lastly, the PROCESS Model 1 was run again, but adding the color type of packaging combination (ColorTP) as covariates. The results still confirm the significance of the effect of arousal on purchase intention ($b=0.1471$, $SE=0.0457$, $t=3.2159$, $p=.0015$), but the effect of HSP trait on purchase intention ($b=0.0303$, $SE=0.1029$, $t=0.2947$, $p=.7685$) and the interaction

between arousal and HSP trait ($b=-0.0583$, $SE=0.0750$, $t=-0.7768$, $p=.4382$) were not significant. Additionally, the color type was not significant as well ($b=-0.0048$, $SE=0.1427$, $t=-0.0338$, $p=.9730$), meaning that neither complementary nor analogous color type of packaging explains additional variance on purchase intention when considering arousal and HSP trait.

To further explore the effect of each color within this exploratory model, the PROCESS Model 1 was run with arousal as the independent variable, purchase intention as the dependent variable, HSP trait (AVG_H) as the moderator, and three dummy variables which represent the color conditions as covariates. The results revealed that the effect of arousal on purchase intention was significant ($b=0.1342$, $SE=0.0447$, $t=3.0052$, $p=.0030$), but the effect of HSP trait on purchase intention ($b=0.0125$, $SE=0.1031$, $t=0.1210$, $p=.9038$) and the interaction between arousal and HSP trait ($b=-0.0594$, $SE=0.0760$, $t=-0.7813$, $p=.4356$) were not significant, considering the blue and green color combination as the reference category. However, although it did not change the significance of the effects, two color dummies were significant: red and orange ($b=0.4157$, $SE=0.1978$, $t=2.1015$, $p=.0369$), and blue and orange ($b=0.4762$, $SE=0.1950$, $t=2.4418$, $p=.0155$), meaning that those colors have a minimal positive effect on purchase intention, even did not interact with HSP trait or change the arousal levels.

Robustness tests were performed, and neither removing the answers from participants who indicated low realism nor excluding the responses of those who did not answer the attention check question correctly changed the results. However, when removing both groups simultaneously, the first hypothesis became marginally non-significant ($p=.066$), although the overall pattern of mean values remained similar, meaning that this slight change is likely due to the reduced sample size, while the conclusions for the other hypotheses remained unchanged.

Overall, results showed that just the H1 was confirmed, revealing that packaging color combinations influence purchase intention, while the other hypotheses were not supported, as complementary versus analogous combinations did not differ significantly in purchase intention, and the effect of different packaging color combinations on purchase intention is not moderated by HSP trait nor mediated by arousal. The complementary analysis shows homogeneity of the sample regarding HSP trait and arousal levels when exposed to the different images, that participants were equally distributed in terms of HSP trait across the four images packaging color conditions, and that the combination of colors did not generate significant differences in terms of arousal. However, arousal and purchase intention were positively correlated, with arousal predicting higher purchase intention.

5. Discussion

According to Khan and Ali (2024), snack food packaging generates positive responses in potential buyers and encourages purchase. The various packaging elements, considered sensory cues, attract customers and influence purchase intention (Vaishnavi et al., 2022), as is the case with color. In the specific case of chocolates, it has been studied that colors influence purchase, however, depending on the levels of arousal of individuals, or if people are highly sensitive (HSP) or not (NHSP), this can alter the levels of purchase intention.

In this way, the current study aimed to explore how the purchase intention for chocolate differs depending on the color combination of its packaging (complementary vs. analogous) among highly sensitive persons and depending on the level of arousal. Therefore, the presented results did not confirm all the hypotheses developed based on the review.

The results of the first hypothesis confirmed that different packaging color combinations of chocolate influence purchase intention, which is consistent with the previous research of Vaishnavi CK et al. (2022), who affirm that colors impact the purchase intention of chocolate. This result is also supported by the fact that color attracts customers' attention, and its aesthetics influences their decision-making and willingness to purchase the product (Khan & Ali, 2024; Martinez et al., 2021). In addition to the comparison of the four colors, the post-hoc analysis revealed that the blue and orange complementary combination led to a higher purchase, especially when compared with red and green complementary, and blue and green analogous combinations. A possible interpretation for this result consists of the specific combination of contrasting colors that are more visually catching and the presence of the color orange, which is associated with the food industry, especially chocolate. Chocolate is a sensory and social product, and these types of products are often more closely associated with that color (Martinez et al., 2021).

Regarding the H1a, the results demonstrate that chocolate packaging with complementary color combinations does not generate significantly higher purchase intention comparing with the packaging composed by analogous colors. Although the descriptive values presented the expected theoretical direction, with packaging with complementary combinations presenting slightly higher purchase intention, the difference is not strong enough to validate the hypotheses. Therefore, this finding is different from what was expected from the literature review study, as Martinez et al. (2021) mentioned that complementary colors create higher contrast when placed side by side, which is assumed to be more visual appealing than analogous, and that, according with Khan and Ali (2024), customers tend to choose the product

whose packaging colors attract more their attention. However, these results may be influenced by other causes, given that, rather than colors, the images, typefaces, and shapes of the packages also influence people's preferences and perceptions (Baptista et al., 2022). Even in the context of colors, the saturation, brightness, and hue influence the consumers' attitude towards a product (Amaro et al., 2022). In the present study, the images vary in terms of hue, but not too much in terms of brightness and saturation, suggesting that the manipulation may have been insufficiently intense, which could help explain the weak effects observed. Another factor that may have affected the analysis was the choice of red and orange combination of colors for one of the analogous packages, because, although these colors were expected to generate less purchase intention than complementary combinations, they are also a combination of warm colors, which is more likely to increase purchase intention for vice foods, that is the case of chocolate (Su and Wang, 2024). In fact, the descriptives of the Onaway ANOVA for H1 show that this package color combination is the second most influential on purchase intention. In conclusion, the results reveal that the combination of colors, complementary vs analogous colors in the chocolate package alone does not explain the purchase intention of chocolate.

Turning to H2, it was not supported, meaning that HSP did not moderate the effect of different packaging color combinations (complementary vs analogous) on purchase intention, which contrasts with what was expected based on the literature review. According to Amaro et al. (2022), HSP typically pay more attention to detail, notice things that are not perceptible to others (Malewska et al., 2024), and are sensitive and reactive to slight color contrast, becoming uncomfortable with it. Thus, a possible explanation for those results can be the chosen hues of the colors, which may not have been sufficiently stimulating to activate high responsiveness from HSP individuals. Additionally, although exploratory analysis confirmed that participants were evenly distributed across the four versions in terms of HSP trait, it presents homogeneity, with an absence of very high or very low HSP values.

Lastly, H3 was also not confirmed, as arousal did not mediate the effect of different packaging color combinations (complementary vs analogous) on purchase intention. Although there was an effect of arousal predicting purchase intention, which aligns with literature that says higher levels of arousal result in greater purchase intention (Fennell & Schneider, 2023), the effect of packaging color type on arousal was not significant, differing from the theoretical expectation that colors can affect the arousal felt by individuals (Walters et al., 1982), and the higher the visual complexity, the higher the arousal Küller et al. (2009). One possible explanation for the absence of the mediation effect can be the same as what happened with H2, as the color combinations used may not have been intense enough to evoke a significant level

of arousal, as well as the lack of patterns and the soft asymmetry, which may have decreased the likelihood of increasing the arousal.

Regarding the exploratory analysis, it examined whether the relationship between arousal and purchase intention is moderated by HSP trait, while considering the four packaging color conditions. The results consistently showed that arousal predicts purchase intention, as noted in H3, even when considering color type, complementary vs analogous, and for each of the four color combinations. However, the HSP trait does not moderate this relationship. Therefore, when considering the packaging colors, the results are the same as those previously found, suggesting that arousal contributes to purchase intention independent of the combination of colors of the packaging. Given these were exploratory tests, these findings should be interpreted with caution and used to suggest future research rather than as confirmatory evidence.

5.1 Theoretical and managerial implications

The current paper contributes to the literature on color and consumer behavior by providing empirical support for Color Psychology Theory, suggesting that specific combinations of colors, such as blue and orange, can lead to purchase intention. Although this combination can be characterized as complementary, catching more attention and influencing purchase intention, as indicated by Khan and Ali (2024), the fact that the other complementary combination did not produce the same effect, it suggests that this assumption cannot be considered alone. Regarding Sensory Processing Sensitivity, specifically the HSP trait, which is a recent research topic, this study suggests that people with this trait may not react strongly to specific color contrast. Align with Amaro et al. (2022), who noted that HSP are more sensitive to other sensory cues, such as lights and textures, these additional stimuli may be necessary to observe differences in responses. Finally, in terms of arousal, the findings show that arousal predicts purchase intention. However, it also suggests that the combination of colors alone may not be sufficiently strong to stimulate arousal responses.

On the side of managerial contribution, as color strongly contributes to the rapid evaluation of products (Martinez et al., 2021), the results of this study indicate that the specific blue and orange color combination increases purchase intention. On the other hand, as the study had no significant differences between complementary and analogous color combinations on purchase intention, companies and marketers should not assume that complementary combinations are more effective without considering other factors. In fact, the symbolic qualities of colors should be considered, as the analogous combination of red and orange, which is a combination of warm colors, also indicated relatively high purchase intention for chocolate.

Regarding the HSP trait, chocolate companies that are looking to target highly sensitive consumers may need to consider stronger stimuli than just combinations of colors alone. Lastly, although arousal significantly predicts purchase intention, it was not activated solely by the combination of colors, therefore, companies aiming to increase purchase intention through arousal should consider combining additional sensory cues beyond color.

5.2 Limitations and suggestions for future research

This study contains some limitations that should be considered when analyzing the results and addressed in future research. There was a limited amount of time to share the questionnaire and obtain answers, as well as limited distribution channels available, resulting in a small sample that was not representative of the entire population. Regarding distribution, it was online, meaning there was no control over external variables, such as lightness, type of screen, and participants' physical environment. Additionally, it was mainly shared with the Portuguese population, while the questionnaire was conducted in English, which may have led to certain words or questions being misunderstood, and, thus, influenced the results. To address these limitations in future research, data should be collected in more countries, over a longer period of time, in a laboratory environment, and with the questions adapted to the language of each country.

The perceived realism of the chocolate packages can be seen as a limitation that results from limited resources and a lack of knowledge on how to produce realistic mock-ups. Additionally, in further research, other visual elements could be tested, such as different variations in hue, saturation, and value. Other options include recreating the shape, typeface, or layout with the same or different colors, or adding patterns. These additional visual elements may also help clarify why packaging did not significantly influence arousal.

Regarding the measurement of arousal in the study, it was only possible to assess through subjective self-report measures, which may not capture participants' real emotional reactions. It would be interesting to consider the use of biometric responses in future research, allowing access to heart rate, skin conductance responses, and brain waves.

However, as the product of analysis was chocolate, and it is characterized as a low involvement product, consumers tend to make fast purchase decisions and may pay limited attention to the visual cues, such as complementary vs analogous combinations. In this way, a mixed-methods approach combining qualitative and quantitative research methods may be more effective, starting with conducting qualitative interviews or focus groups, using the packaging stimuli to explore the meanings and associations triggered by each packaging color

combination, and then using that information to develop the quantitative experiment and test the proposed reasons behind consumers' reactions.

Finally, since the study examined the HSP trait as a moderator, it is important to ensure that future research contains a heterogeneous sample in terms of this trait, which was not the case in this study.

6. Conclusion

To finalize, after testing different color combinations for chocolate packaging and analyzing the results regarding purchase intention, as well as the possible moderation by the HSP trait and the mediation of arousal on that effect, the following conclusions were drawn.

After analyzing the results of the quantitative research, it was found that the blue and orange color combination was associated with higher purchase intention for chocolate, and that arousal significantly predicted purchase intention regardless of the packaging color combination. However, it was not possible to conclude that complementary color combinations generate higher purchase intention than analogous color combinations, nor that the HSP trait moderates the relationship between color combinations and purchase intention, or that color combinations have significantly activated arousal.

Therefore, more study is needed, as the HSP trait may moderate the effect of different color combinations on purchase intention in the presence of stronger stimuli, and such stimuli may also activate arousal responses.

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Appendices

Appendices 1 – Questionnaire

Start of Block: Introduction

Q1 Introduction **Dear participant,** This is a study about the **influence of packaging** on consumer behavior. The questionnaire will take **around 5 minutes**. Please **read everything very carefully** and **answer honestly** so you can help us get good quality data for our study. Keep in mind that there are **no wrong or right answers**. Voluntary participation and **confidentiality**: The answers will be collected **anonymously** and used exclusively for the purpose of this research. Results may include summary data, but you will never be identified. We do not anticipate any risks from the participation in the study. However, your participation in this research is entirely voluntary. It is your right to withdraw from the survey at any time. If you have any question or concern regarding the present questionnaire or research project, please refer to Rita Cruz (s-rgrucz@ucp.pt). Thank you so much for your participation. **By selecting one of the options below, you indicate whether you authorize the processing of the data collected in this study:**

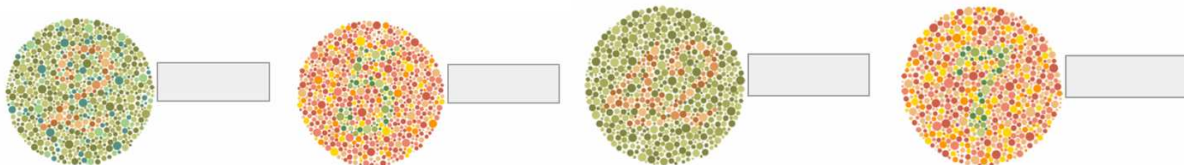
- I authorize the processing of the data collected and agree to participate in this study. (1)
- I do not authorize the processing of the data collected and wish to exit the questionnaire. (2)

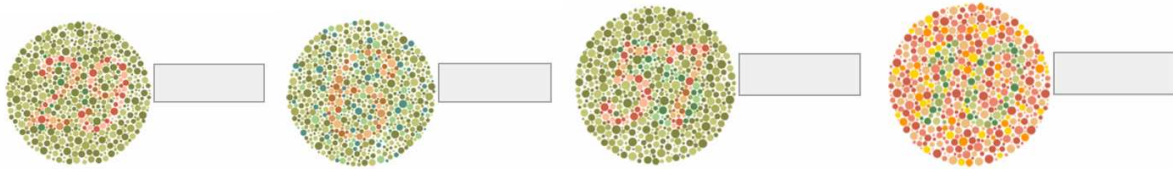
Skip To: End of Survey If Dear participant, This is a study about the influence of packaging on consumer behavior. The que... = I do not authorize the processing of the data collected and wish to exit the questionnaire.

End of Block: Introduction

Start of Block: Color-blindness Test

Q2 Color Blindness **Please write the numbers you see on each plate:** *Question sourced from: Color Vision Testing — “Ishihara (PIP) Color Vision Test.” Retrieved October 15, 2025, from <http://www.colorvisiontesting.com/ishihara>*





End of Block: Color-blindness Test

Start of Block: Instructions

Q3 Instructions In the next section, you will see a chocolate package. **Please pay close attention** and answer the following questions about it. **To ensure that you correctly see the image, please do not use the night mode light, and maximize the brightness.**

End of Block: Instructions

Start of Block: RG: Purchase Intention, Attention Check, Arousal

Q4 Image **Imagine that you are in the shop, and you are seeing the following package of chocolate: (Pay close attention)**




Page Break

Q5 Purchase Intent Now how likely is it that you, yourself, would purchase this product? Indicate on a scale from 1 to 5 (1 = definitely will not buy; 5 = definitely will buy)

- 1 = definitely will not buy (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 = definitely will buy (5)

Page Break

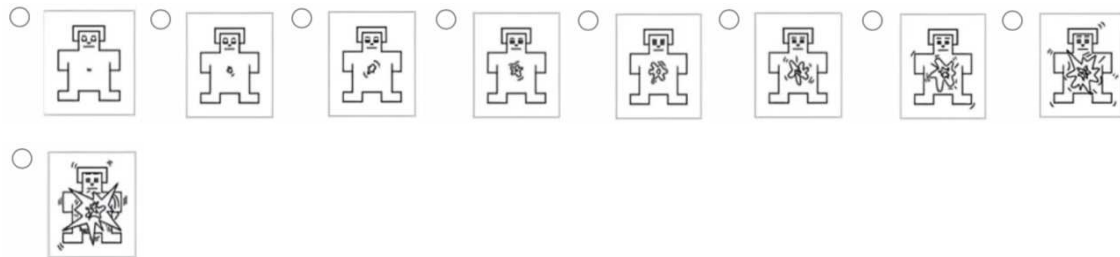
 Q6 Attention Check The image you just saw shows a chocolate bar package colored in:

- red and green (1)

- red and orange (2)
- blue and orange (3)
- blue and green (4)

Page Break

Q7 Img Arousal How excited, stimulated, or alert did you feel while viewing the chocolate package? Please select the image that best represents how you felt.”.



End of Block: RG: Purchase Intention, Attention Check, Arousal

Start of Block: RO: Purchase Intention, Attention Check, Arousal

Q50 Imagine that you are in the shop, and you are seeing the following package of chocolate: (Pay close attention)



Page Break

Q52 Now how likely is it that you, yourself, would purchase this product? Indicate on a scale from 1 to 5 (1 = definitely will not buy; 5 = definitely will buy)

- 1 = definitely will not buy (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 = definitely will buy (5)

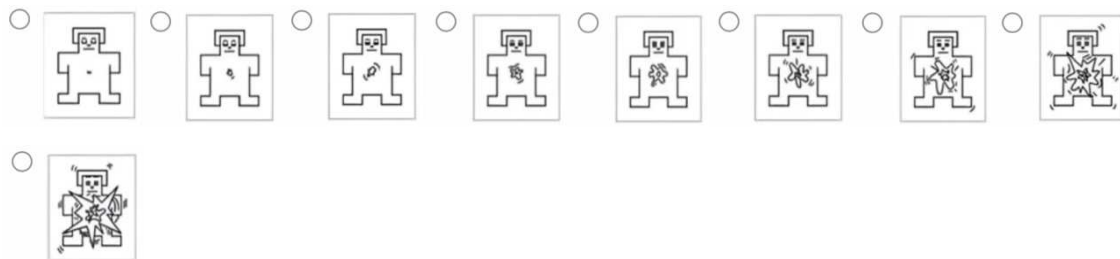
Page Break

 Q53 The image you just saw shows a chocolate bar package colored in:

- red and green (1)
- red and orange (2)
- blue and orange (3)
- blue and green (4)

Page Break

Q54 How excited, stimulated, or alert did you feel while viewing the chocolate package? Please select the image that best represents how you felt.”



End of Block: RO: Purchase Intention, Attention Check, Arousal

Start of Block: BO: Purchase Intention, Attention Check, Arousal

Q55 Imagine that you are in the shop, and you are seeing the following package of chocolate: (Pay close attention)



Page Break

Q57 Now how likely is it that you, yourself, would purchase this product? Indicate on a scale from 1 to 5 (1 = definitely will not buy; 5 = definitely will buy)

- 1 = definitely will not buy (1)
- 2 (2)
- 3 (3)

4 (4)

5 = definitely will buy (5)

Page Break

 Q58 The image you just saw shows a chocolate bar package colored in:

red and green (1)

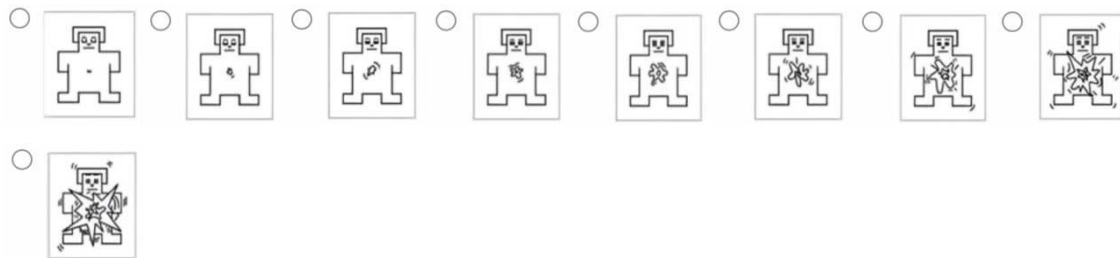
red and orange (2)

blue and orange (3)

blue and green (4)

Page Break

Q59 How excited, stimulated, or alert did you feel while viewing the chocolate package? Please select the image that best represents how you felt.”.



End of Block: BO: Purchase Intention, Attention Check, Arousal

Start of Block: BG: Purchase Intention, Attention Check, Arousal

Q60 **Imagine that you are in the shop, and you are seeing the following package of chocolate: (Pay close attention)**



Page Break

Q62 Now how likely is it that you, yourself, would purchase this product? Indicate on a scale from 1 to 5 (1 = definitely will not buy; 5 = definitely will buy)

1 = definitely will not buy (1)

- 2 (2)
- 3 (3)
- 4 (4)
- 5 = definitely will buy (5)

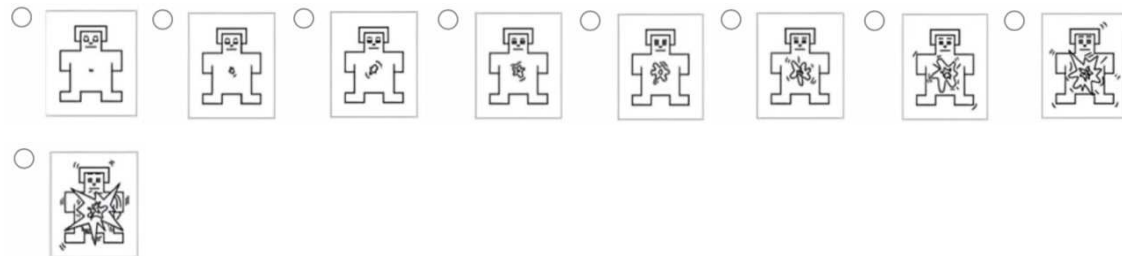
Page Break

 Q63 The image you just saw shows a chocolate bar package colored in:

- red and green (1)
- red and orange (2)
- blue and orange (3)
- blue and green (4)

Page Break

Q64 How excited, stimulated, or alert did you feel while viewing the chocolate package? Please select the image that best represents how you felt.”



End of Block: BG: Purchase Intention, Attention Check, Arousal

Q8 Scenario Realism Please indicate on a scale from 1 to 7 (1 = Nothing realistic; 7 = Totally realistic) the perceived realism of the chocolate bar packaging (i.e., in what extent it could exist, in real life.):

- 1 = Nothing realistic
- 2
- 3
- 4
- 5

6

7 = Totally realistic

End of Block: Manipulation Check

Start of Block: Highly Sensitive Person (HSP) Trait

Q9 HSP Trait For each of the following items, please indicate on a scale from 1 to 7 (1 = Not at all; 7 = Extremely) what applies to you:

	1 = Not at all	2	3	4 = Moderately	5	6	7 Extremely	=
Do you seem to be aware of subtleties in your environment?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	
Are you easily overwhelmed by things like bright lights, strong smells, coarse fabrics, or sirens close by?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	
Do you have a rich, complex inner life?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	
Do you get rattled when you have a lot to do in a short amount of time?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	
Are you deeply moved by the arts or music?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	
Are you annoyed when people try to get you to do too many things at once?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	
Do you make a point to avoid violent movies and TV shows?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	
Do you find it unpleasant to have a lot going on at once?	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>		<input type="radio"/> <input type="radio"/>	<input type="radio"/>	

Do changes in your life shake you up?

Do you notice and enjoy delicate or fine scents, tastes, sounds, works of art?

Are you bothered by intense stimuli, like loud noises or chaotic scenes?

When you must compete or be observed while performing a task, do you become so nervous or shaky that you do much worse than you would otherwise?

End of Block: Highly Sensitive Person (HSP) Trait

Start of Block: Control Variables

Q10 Liking for Choco Please indicate to what extent you agree with the following statement:

Strongly Disagree Somewhat Neither Somewhat Agree Strongly
disagree disagree agree agree agree
nor
disagree

I like chocolate

Q11 Purchase Freque How often do you usually buy chocolate (for yourself or for others)?

- Never (1)
- Rarely (less than once a month) (2)
- Occasionally (1–2 times per month) (3)
- Regularly (about once a week) (4)
- Frequently (several times per week) (5)

Q12 Current Hunger Please indicate how much you agree with the following statement:

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Right now, I feel hungry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13 Color Preference Please indicate how much you like each of the following colors:

	None at all	A little	Slightly	Moderately	Quite a bit	Very much	Extremely
I like the color red	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the color green	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the color orange	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like the color blue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Control Variables

Start of Block: Demographics

Q14 Gender What is your gender?

- Male
- Female
- Prefer not to say

Q15 Age What is your age?

- 18–24

- 25–34
- 35–44
- 45–54
- 55–64
- 65+

Q16 Country Which country are you from?

▼ Afghanistan (1) ... Zimbabwe (195)

Q17 Education Level What is your education level?

- High school (1)
- Bachelor's degree (2)
- Master's degree (3)
- PhD (4)
- Other (5) _____

Q18 Work Status What is your work status?

- Student (1)
- Working Student (2)
- Unemployed (3)
- Employed (4)
- Retired (5)
- Prefer not to say (6)
- Other (7) _____

End of Block: Demographics

Appendices 2 – Tables

Table A 1 - Scenario Realism - Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Low Realism	40	19.4	19.4	19.4
	High Realism	166	80.6	80.6	100.0
	Total	206	100.0	100.0	

Table A 2 - Packaging Color Combination - Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Red and Green	53	25.7	25.7	25.7
	Red and Orange	52	25.2	25.2	51.0
	Blue and Orange	50	24.3	24.3	75.2
	Blue and Green	51	24.8	24.8	100.0
	Total	206	100.0	100.0	

Table A 3 - Country Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Angola	1	.5	.5	.5
	Argentina	1	.5	.5	1.0
	Austria	1	.5	.5	1.5
	Brazil	2	1.0	1.0	2.4
	Canada	1	.5	.5	2.9
	China	2	1.0	1.0	3.9
	France	2	1.0	1.0	4.9
	Germany	3	1.5	1.5	6.3
	Iceland	1	.5	.5	6.8
	Italy	2	1.0	1.0	7.8
	Portugal	187	90.8	90.8	98.5
	Spain	1	.5	.5	99.0
	United States of America	2	1.0	1.0	100.0
	Total	206	100.0	100.0	

Table A 4 - Gender - Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	57	27.7	27.7	27.7
	Female	148	71.8	71.8	99.5
	Other	1	.5	.5	100.0
	Total	206	100.0	100.0	

Table A 5 - Age - Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	92	44.7	44.7	44.7
	25-34	29	14.1	14.1	58.7
	35-44	13	6.3	6.3	65.0
	45-54	54	26.2	26.2	91.3
	55-64	14	6.8	6.8	98.1
	65+	4	1.9	1.9	100.0
	Total	206	100.0	100.0	

Table A 6 - Education Level - Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School	39	18.9	18.9	18.9
	Bachelor's Degree	78	37.9	37.9	56.8
	Master's Degree	77	37.4	37.4	94.2
	PhD	4	1.9	1.9	96.1
	Other	8	3.9	3.9	100.0
	Total	206	100.0	100.0	

Table A 7 - Working Status - Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	56	27.2	27.2	27.2
	Working Student	32	15.5	15.5	42.7
	Unemployed	3	1.5	1.5	44.2
	Employed	103	50.0	50.0	94.2
	Retired	5	2.4	2.4	96.6
	Prefer not say	1	.5	.5	97.1
	Other	6	2.9	2.9	100.0
	Total	206	100.0	100.0	

Table A 8 - HSP Trait - Frequencies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non-Highly Sensitive	94	45.6	45.6	45.6
	Highly Sensitive	112	54.4	54.4	100.0
	Total	206	100.0	100.0	

Table A 9 - Reliability Test (Cronbach's alpha) - HSP Trait

Reliability Statistics

Cronbach's Alpha	N of Items
.722	12

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
H1	49.40	73.559	.166	.724
H2	49.42	65.093	.420	.694
H3	49.49	71.939	.199	.723
H4	49.49	65.080	.493	.686
H5	49.22	65.830	.416	.695
H6	49.43	66.988	.398	.698
H7	50.32	68.238	.191	.735
H8	49.90	64.063	.543	.679
H9	49.74	67.043	.413	.697
H10	48.87	68.846	.341	.706
H11	49.17	65.026	.436	.692
H12	49.67	67.715	.305	.711

Table A 10 - H1: Test of Homogeneity of Variances - Oneway

Tests of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.	
Purchase Intention	Based on Mean	2.062	3	202	.106
	Based on Median	1.956	3	202	.122
	Based on Median and with adjusted df	1.956	3	200.750	.122
	Based on trimmed mean	2.183	3	202	.091

Table A 11 - H1: ANOVA - Oneway

ANOVA

Purchase Intention

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.220	3	4.740	4.458	.005
Within Groups	214.775	202	1.063		
Total	228.995	205			

Table A 12 - H1: Descriptives - Oneway

Descriptives

Purchase Intention

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Red and Green	53	2.74	.944	.130	2.48	3.00	1	5
Red and Orange	52	3.19	1.121	.155	2.88	3.50	1	5
Blue and Orange	50	3.34	1.136	.161	3.02	3.66	1	5
Blue and Green	51	2.76	.907	.127	2.51	3.02	1	5
Total	206	3.00	1.057	.074	2.86	3.15	1	5

Table A 13 – H1: ANOVA Effect Sizes - Oneway

ANOVA Effect Sizes^{a,b}

		Point Estimate	95% Confidence Interval	
			Lower	Upper
Purchase Intention	Eta-squared	.062	.007	.125
	Epsilon-squared	.048	-.008	.112
	Omega-squared Fixed-effect	.048	-.008	.111
	Omega-squared Random-effect	.017	-.003	.040

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
 b. Negative but less biased estimates are retained, not rounded to zero.

Table A 14 - H1: Post Hoc Tests - Oneway

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Purchase Intention
 Tukey HSD

(I) Packaging Color Combination	(J) Packaging Color Combination	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Red and Green	Red and Orange	-.456 [*]	.201	.109	-.98	.06
	Blue and Orange	-.604 [*]	.203	.017	-1.13	-.08
	Blue and Green	-.029	.202	.999	-.55	.50
Red and Orange	Red and Green	.456	.201	.109	-.06	.98
	Blue and Orange	-.148	.204	.888	-.68	.38
	Blue and Green	.428	.203	.155	-.10	.95
Blue and Orange	Red and Green	.604 [*]	.203	.017	.08	1.13
	Red and Orange	.148	.204	.888	-.38	.68
	Blue and Green	.575 [*]	.205	.028	.04	1.11
Blue and Green	Red and Green	.029	.202	.999	-.50	.55
	Red and Orange	-.428	.203	.155	-.95	.10
	Blue and Orange	-.575 [*]	.205	.028	-1.11	-.04

*. The mean difference is significant at the 0.05 level.

Table A 15 - H1a: Independent Sample T-Test

T-Test

Group Statistics

	Complementary (1) vs Analogous (0)	N	Mean	Std. Deviation	Std. Error Mean
	Complementary	103	3.03	1.080	.106

Independent Samples Test

Levene's Test for Equality of Variances				t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
Purchase Intention	Equal variances assumed	.109	.742	-.329	204	.371	.743	-.049	.148	-.340	.242
	Equal variances not assumed			-.329	203.688	.371	.743	-.049	.148	-.340	.242

Independent Samples Effect Sizes

	Standardizer ^a	Point Estimate	95% Confidence Interval	
			Lower	Upper
Purchase Intention	Cohen's d	1.059	-.046	.227
	Hedges' correction	1.063	-.046	.227
	Glass's delta	1.080	-.045	.228

a. The denominator used in estimating the effect sizes.
 Cohen's d uses the pooled standard deviation.
 Hedges' correction uses the pooled standard deviation, plus a correction factor.
 Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Table A 16 - H2: Process Model 1

```

*****
Model : 1
Y : Y1
X : ColorTP
W : AVG_H

Sample
Size: 206

*****
OUTCOME VARIABLE:
Y1

Model Summary
R          R-sq      MSE      F(HC3)      df1      df2      p
.0534      .0029      1.1304      .1855      3.0000      202.0000      .9062

Model
      coeff      se(HC3)      t      p      LLCI      ULCI
constant      2.9821      .1040      28.6797      .0000      2.7771      3.1871
ColorTP        .0458      .1494      .3067      .7594      -.2487      .3403
AVG_H          .0759      .1385      .5482      .5842      -.1972      .3491
Int_1         -.0164      .2016     -.0815      .9351     -.4140      .3811

Product terms key:
Int_1 :      ColorTP x      AVG_H

Test(s) of highest order unconditional interaction(s):
R2-chng      F(HC3)      df1      df2      p
X*W          .0000      .0066      1.0000      202.0000      .9351
-----
      Focal predict: ColorTP (X)
      Mod var:      AVG_H (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

```

Table A 17 - H3: Outcome Variable M1 and Y1 - Process Model 4

```

*****
Model : 4
Y : Y1
X : ColorTP
M : M1

Sample
Size: 206

*****
OUTCOME VARIABLE:
M1

Model Summary
R          R-sq      MSE      F      df1      df2      p
.0742      .0055      3.3688      1.1297      1.0000      204.0000      .2891

Model
      coeff      se      t      p      LLCI      ULCI
constant      2.7961      .1809      15.4609      .0000      2.4395      3.1527
ColorTP        .2718      .2558      1.0629      .2891      -.2324      .7761

Standardized coefficients
      coeff
ColorTP      .1481

*****
OUTCOME VARIABLE:
Y1

Model Summary
R          R-sq      MSE      F      df1      df2      p
.2566      .0658      1.0538      7.1548      2.0000      203.0000      .0010

Model
      coeff      se      t      p      LLCI      ULCI
constant      2.5681      .1491      17.2285      .0000      2.2742      2.8620
ColorTP        .0084      .1434      .0588      .9531      -.2744      .2913
M1            .1475      .0392      3.7676      .0002      .0703      .2247

Standardized coefficients
      coeff
ColorTP      .0080
M1           .2563

```

Table A 18 - H3: Direct and Indirect Effects of X on Y - Process Model 4

```

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****
Direct effect of X on Y
  Effect      se      t      p      LLCI      ULCI      c'_ps
  .0084      .1434      .0588      .9531      -.2744      .2913      .0080

Indirect effect(s) of X on Y:
  Effect      BootSE      BootLLCI      BootULCI
M1      .0401      .0404      -.0351      .1272

Partially standardized indirect effect(s) of X on Y:
  Effect      BootSE      BootLLCI      BootULCI
M1      .0379      .0380      -.0343      .1197
    
```

Table A 19 – Complementary: HSP Trait - Frequencies

		AVG_H			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	1	.5	.5	.5
	2.33	1	.5	.5	1.0
	2.58	1	.5	.5	1.5
	2.67	1	.5	.5	1.9
	2.75	1	.5	.5	2.4
	2.83	1	.5	.5	2.9
	2.92	2	1.0	1.0	3.9
	3.00	2	1.0	1.0	4.9
	3.25	1	.5	.5	5.3
	3.33	2	1.0	1.0	6.3
	3.42	2	1.0	1.0	7.3
	3.50	1	.5	.5	7.8
	3.58	2	1.0	1.0	8.7
	3.67	5	2.4	2.4	11.2
	3.75	6	2.9	2.9	14.1
	3.83	9	4.4	4.4	18.4
	3.92	8	3.9	3.9	22.3
	4.00	6	2.9	2.9	25.2
	4.08	6	2.9	2.9	28.2
	4.17	9	4.4	4.4	32.5
	4.25	7	3.4	3.4	35.9
	4.33	11	5.3	5.3	41.3
	4.42	9	4.4	4.4	45.6
	4.50	12	5.8	5.8	51.5
	4.58	10	4.9	4.9	56.3
	4.67	9	4.4	4.4	60.7
	4.75	11	5.3	5.3	66.0
	4.83	5	2.4	2.4	68.4
	4.92	8	3.9	3.9	72.3
	5.00	12	5.8	5.8	78.2
	5.08	6	2.9	2.9	81.1
	5.17	6	2.9	2.9	84.0
	5.25	4	1.9	1.9	85.9
5.33	7	3.4	3.4	89.3	
5.42	3	1.5	1.5	90.8	
5.50	3	1.5	1.5	92.2	
5.58	3	1.5	1.5	93.7	
5.67	4	1.9	1.9	95.6	
5.75	2	1.0	1.0	96.6	
5.83	3	1.5	1.5	98.1	
5.92	1	.5	.5	98.5	
6.00	2	1.0	1.0	99.5	
6.42	1	.5	.5	100.0	
Total		206	100.0	100.0	

Table A 20 – Complementary: Arousal - Frequencies

		Arousal			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 – Calm	58	28.2	28.2	28.2
	2	42	20.4	20.4	48.5
	3	38	18.4	18.4	67.0
	4	26	12.6	12.6	79.6
	5	24	11.7	11.7	91.3
	6	10	4.9	4.9	96.1
	7	3	1.5	1.5	97.6
	8	2	1.0	1.0	98.5
	9 – Excited	3	1.5	1.5	100.0
Total		206	100.0	100.0	

Table A 21 – Exploratory (ColorTP – AVG_H): Test of Homogeneity of Variances - Oneway

Tests of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
AVG_H	Based on Mean	.693	3	202	.557
	Based on Median	.682	3	202	.564
	Based on Median and with adjusted df	.682	3	200.446	.564
	Based on trimmed mean	.736	3	202	.532

Table A 22 – Exploratory (ColorTP – AVG_H): ANOVA - Oneway

ANOVA					
AVG_H					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.517	3	.172	.314	.815
Within Groups	110.941	202	.549		
Total	111.458	205			

Table A 23 – Exploratory (ColorTP – AVG_H): Descriptives - Oneway

Descriptives								
AVG_H								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Red and Green	53	4.4686	.70620	.09700	4.2739	4.6632	2.33	6.00
Red and Orange	52	4.5160	.81650	.11323	4.2887	4.7433	2.67	6.00
Blue and Orange	50	4.5767	.68674	.09712	4.3815	4.7718	2.58	5.83
Blue and Green	51	4.4444	.74697	.10460	4.2344	4.6545	2.00	6.42
Total	206	4.5008	.73736	.05137	4.3995	4.6021	2.00	6.42

Table A 24 – Exploratory (ColorTP – AVG_H): ANOVA Effect Sizes - Oneway

ANOVA Effect Sizes^{a,b}

		Point Estimate	95% Confidence Interval	
			Lower	Upper
AVG_H	Eta-squared	.005	.000	.023
	Epsilon-squared	-.010	-.015	.008
	Omega-squared Fixed-effect	-.010	-.015	.008
	Omega-squared Random-effect	-.003	-.005	.003

- a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
- b. Negative but less biased estimates are retained, not rounded to zero.

Table A 25 – Exploratory (ColorTP – AVG_H): Post hoc Tests - Oneway

Post Hoc Tests

Multiple Comparisons

Dependent Variable: AVG_H
Tukey HSD

(I) Packaging Color Combination	(J) Packaging Color Combination	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Red and Green	Red and Orange	-.04747	.14465	.988	-.4222	.3273
	Blue and Orange	-.10811	.14611	.881	-.4866	.2704
	Blue and Green	.02411	.14537	.998	-.3525	.4007
Red and Orange	Red and Green	.04747	.14465	.988	-.3273	.4222
	Blue and Orange	-.06064	.14679	.976	-.4409	.3196
	Blue and Green	.07158	.14605	.961	-.3068	.4499
Blue and Orange	Red and Green	.10811	.14611	.881	-.2704	.4866
	Red and Orange	.06064	.14679	.976	-.3196	.4409
	Blue and Green	.13222	.14749	.807	-.2499	.5143
Blue and Green	Red and Green	-.02411	.14537	.998	-.4007	.3525
	Red and Orange	-.07158	.14605	.961	-.4499	.3068
	Blue and Orange	-.13222	.14749	.807	-.5143	.2499

Table A 26 - Exploratory (ColorTP – Arousal): Test of Homogeneity of Variances - Oneway

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Arousal	Based on Mean	.543	3	202	.653
	Based on Median	.184	3	202	.907
	Based on Median and with adjusted df	.184	3	173.630	.907
	Based on trimmed mean	.428	3	202	.733

Table A 27 - Exploratory (ColorTP – Arousal): ANOVA - Oneway

ANOVA

Arousal

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.530	3	4.510	1.345	.261
Within Groups	677.519	202	3.354		
Total	691.049	205			

Table A 28 - Exploratory (ColorTP – Arousal): Descriptives - Oneway

Descriptives								
Arousal								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Red and Green	53	2.77	1.948	.268	2.24	3.31	1	9
Red and Orange	52	2.85	1.984	.275	2.29	3.40	1	9
Blue and Orange	50	3.38	1.783	.252	2.87	3.89	1	7
Blue and Green	51	2.75	1.573	.220	2.30	3.19	1	6
Total	206	2.93	1.836	.128	2.68	3.18	1	9

Table A 29 - Exploratory (ColorTP – Arousal): ANOVA Effect Sizes - Oneway

ANOVA Effect Sizes ^{a,b}				
		Point Estimate	95% Confidence Interval	
			Lower	Upper
Arousal	Eta-squared	.020	.000	.059
	Epsilon-squared	.005	-.015	.045
	Omega-squared Fixed-effect	.005	-.015	.045
	Omega-squared Random-effect	.002	-.005	.015

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Table A 30 - Exploratory (ColorTP – Arousal): Post Hoc Tests - Oneway

Post Hoc Tests

Multiple Comparisons							
Dependent Variable: Arousal							
Tukey HSD							
(I) Packaging Color Combination	(J) Packaging Color Combination	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
Red and Green	Red and Orange	-.073	.357	.997	-1.00	.85	
	Blue and Orange	-.606	.361	.337	-1.54	.33	
	Blue and Green	.028	.359	1.000	-.90	.96	
Red and Orange	Red and Green	.073	.357	.997	-.85	1.00	
	Blue and Orange	-.534	.363	.457	-1.47	.41	
	Blue and Green	.101	.361	.992	-.83	1.04	
Blue and Orange	Red and Green	.606	.361	.337	-.33	1.54	
	Red and Orange	.534	.363	.457	-.41	1.47	
	Blue and Green	.635	.364	.305	-.31	1.58	
Blue and Green	Red and Green	-.028	.359	1.000	-.96	.90	
	Red and Orange	-.101	.361	.992	-1.04	.83	
	Blue and Orange	-.635	.364	.305	-1.58	.31	

Table A 31 – Exploratory - Pearson Correlation

Correlations				
		AVG_H	Arousal	PI
AVG_H	Pearson Correlation	1	.072	.049
	Sig. (2-tailed)		.305	.489
	N	206	206	206
Arousal	Pearson Correlation	.072	1	.257**
	Sig. (2-tailed)	.305		<.001
	N	206	206	206
PI	Pearson Correlation	.049	.257**	1
	Sig. (2-tailed)	.489	<.001	
	N	206	206	206

** . Correlation is significant at the 0.01 level (2-tailed).

Table A 32 - Exploratory – Simple Linear Regression

Regression

Variables Entered/Removed ^a			
Model	Variables Entered	Variables Removed	Method
1	Arousal ^b	.	Enter

a. Dependent Variable: PI
 b. All requested variables entered.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.257 ^a	.066	.061	1.024

a. Predictors: (Constant), Arousal

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.075	1	15.075	14.376	<.001 ^b
	Residual	213.920	204	1.049		
	Total	228.995	205			

a. Dependent Variable: PI
 b. Predictors: (Constant), Arousal

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.572	.135		19.097	<.001
	Arousal	.148	.039	.257	3.792	<.001

a. Dependent Variable: PI

Table A 33 - Exploratory - Process Model 1 – Effect of Arousal on Purchase Intention moderated by HSP trait

```

Model : 1
Y : Y1
X : M1
W : AVG_H

Sample
Size: 206

*****
OUTCOME VARIABLE:
Y1

Model Summary
      R      R-sq      MSE      F(HC3)      df1      df2      p
      .2665      .0710      1.0531      3.9648      3.0000      202.0000      .0089

Model
      coeff      se(HC3)      t      p      LLCI      ULCI
constant      3.0105      .0722      41.6908      .0000      2.8681      3.1529
M1              .1470      .0462      3.1835      .0017      .0560      .2380
AVG_H           .0303      .1025      .2958      .7677     -1.1718     .2324
Int_1          -.0581      .0748     -.7770      .4381     -2.2056     .0894

Product terms key:
Int_1 :      M1      x      AVG_H

Test(s) of highest order unconditional interaction(s):
      R2-chng      F(HC3)      df1      df2      p
X*W      .0043      .6037      1.0000      202.0000      .4381
    
```

Table A 34 – Exploratory – Process Model 1 - Effect of Arousal on Purchase Intention moderated by HSP trait, with Color Type as covariates

```

Model : 1
Y : Y1
X : M1
W : AVG_H

Covariates:
ColorTP

Sample
Size: 206

*****
OUTCOME VARIABLE:
Y1

Model Summary
      R      R-sq      MSE      F(HC3)      df1      df2      p
      .2665      .0710      1.0584      3.1668      4.0000      201.0000      .0150

Model
      coeff      se(HC3)      t      p      LLCI      ULCI
constant      3.0129      .0998      30.1977      .0000      2.8162      3.2096
M1              .1471      .0457      3.2159      .0015      .0569      .2373
AVG_H           .0303      .1029      .2947      .7685     -1.1727     .2333
Int_1          -.0583      .0750     -.7768      .4382     -2.2062     .0897
ColorTP        -.0048      .1427     -.0338      .9730     -2.2863     .2766

Product terms key:
Int_1 :      M1      x      AVG_H

Test(s) of highest order unconditional interaction(s):
      R2-chng      F(HC3)      df1      df2      p
X*W      .0043      .6035      1.0000      201.0000      .4382
    
```

Table A 35 – Exploratory – Process Model 1 - Effect of Arousal on Purchase Intention moderated by HSP trait, with Dummy Variables

```

Model : 1
Y : Y1
X : M1
W : AVG_H

Covariates:
D_RG D_RO D_BO

Sample
Size: 206

*****
OUTCOME VARIABLE:
Y1

Model Summary
R .3465
R-sq .1200
MSE 1.0126
F(HC3) 4.5151
df1 6.0000
df2 199.0000
p .0003

Model
coeff se(HC3) t p LLCI ULCI
constant 2.8012 .1221 22.9502 .0000 2.5605 3.0418
M1 .1342 .0447 3.0052 .0030 .0462 .2223
AVG_H .0125 .1031 .1210 .9038 -.1909 .2159
Int_1 -.0594 .0760 -.7813 .4356 -.2094 .0906
D_RG -.0430 .1839 -.2339 .8153 -.4057 .3197
D_RO .4157 .1978 2.1015 .0369 .0256 .8058
D_BO .4762 .1950 2.4418 .0155 .0916 .8607

Product terms key:
Int_1 : M1 x AVG_H

Test(s) of highest order unconditional interaction(s):
R2-chng F(HC3) df1 df2 p
X*W .0044 .6104 1.0000 199.0000 .4356
    
```

Table A 36 - Robustness Test without Low Realism Answers - H1: Test of Homogeneity of Variances - Oneway

Tests of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.	
PI	Based on Mean	6.563	3	162	<.001
	Based on Median	3.302	3	162	.022
	Based on Median and with adjusted df	3.302	3	145.638	.022
	Based on trimmed mean	6.552	3	162	<.001

Table A 37 - Robustness Test without Low Realism Answers - H1: ANOVA - Oneway

ANOVA

PI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.158	3	2.719	2.932	.035
Within Groups	150.281	162	.928		
Total	158.440	165			

Table A 38 - Robustness Test without Low Realism Answers - H1: Descriptives - Oneway

Descriptives

PI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Red and Green	42	2.95	.825	.127	2.70	3.21	1	5
Red and Orange	43	3.40	1.050	.160	3.07	3.72	1	5
Blue and Orange	41	3.44	1.141	.178	3.08	3.80	1	5
Blue and Green	40	3.00	.784	.124	2.75	3.25	1	5
Total	166	3.20	.980	.076	3.05	3.35	1	5

Table A 39 - Robustness Test without Low Realism Answers - H1: ANOVA Effect Sizes -Oneway

ANOVA Effect Sizes^{a,b}

		Point Estimate	95% Confidence Interval	
			Lower	Upper
PI	Eta-squared	.051	.000	.117
	Epsilon-squared	.034	-.019	.100
	Omega-squared Fixed-effect	.034	-.018	.100
	Omega-squared Random-effect	.012	-.006	.036

- a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
- b. Negative but less biased estimates are retained, not rounded to zero.

Table A 40 - Robustness Test without Low Realism Answers - H1: Post Hoc Tests - Oneway

Post Hoc Tests

Multiple Comparisons

Dependent Variable: PI
Tukey HSD

(I) Packaging Color Combination	(J) Packaging Color Combination	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Red and Green	Red and Orange	-.443	.209	.151	-.99	.10
	Blue and Orange	-.487	.211	.102	-1.04	.06
	Blue and Green	-.048	.213	.996	-.60	.50
Red and Orange	Red and Green	.443	.209	.151	-.10	.99
	Blue and Orange	-.044	.210	.997	-.59	.50
	Blue and Green	.395	.212	.246	-.15	.94
Blue and Orange	Red and Green	.487	.211	.102	-.06	1.04
	Red and Orange	.044	.210	.997	-.50	.59
	Blue and Green	.439	.214	.174	-.12	.99
Blue and Green	Red and Green	.048	.213	.996	-.50	.60
	Red and Orange	-.395	.212	.246	-.94	.15
	Blue and Orange	-.439	.214	.174	-.99	.12

Table A 41 - Robustness Test without Low Realism Answers – H1a: Independent Sample T-Test

T-Test

Group Statistics

ColorTP	N	Mean	Std. Deviation	Std. Error Mean
PI Analogous	83	3.20	.947	.104
PI Complementary	83	3.19	1.018	.112

Independent Samples Test

Levene's Test for Equality of Variances				t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
PI	Equal variances assumed	.326	.569	.079	164	.469	.937	.012	.153	-.289	.313
	Equal variances not assumed			.079	163.156	.469	.937	.012	.153	-.289	.313

Independent Samples Effect Sizes

		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
PI	Cohen's d	.983	.012	-.292	.316
	Hedges' correction	.987	.012	-.291	.315
	Glass's delta	1.018	.012	-.292	.316

- a. The denominator used in estimating the effect sizes. Cohen's d uses the pooled standard deviation. Hedges' correction uses the pooled standard deviation, plus a correction factor. Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Table A 42 - Robustness Test without Low Realism Answers – H2: Process Model 1

```

*****
Model : 1
Y : Y1
X : ColorTP
W : AVG_H

Sample
Size: 166

*****
OUTCOME VARIABLE:
Y1

Model Summary
      R      R-sq      MSE      F(HC3)      df1      df2      p
      .0286      .0008      .9772      .0404      3.0000      162.0000      .9891

Model
      coeff      se(HC3)      t      p      LLCI      ULCI
constant      3.2049      .1066      30.0508      .0000      2.9943      3.4155
ColorTP      -.0139      .1552      -.0895      .9288      -.3205      .2927
AVG_H      .0020      .1501      .0130      .9896      -.2944      .2983
Int_1      .0576      .2371      .2429      .8084      -.4107      .5259

Product terms key:
Int_1 :      ColorTP x      AVG_H

Test(s) of highest order unconditional interaction(s):
      R2-chng      F(HC3)      df1      df2      p
X*W      .0004      .0590      1.0000      162.0000      .8084
-----
      Focal predict: ColorTP (X)
      Mod var: AVG_H (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

```

Table A 43 - Robustness Test without Low Realism Answers – H3: Outcome Variable M1 and Y1 – Process Model 4

```

*****
Model : 4
Y : Y1
X : ColorTP
M : M1

Sample
Size: 166

*****
OUTCOME VARIABLE:
M1

Model Summary
      R      R-sq      MSE      F      df1      df2      p
      .0195      .0004      3.4859      .0622      1.0000      164.0000      .8033

Model
      coeff      se      t      p      LLCI      ULCI
constant      2.9880      .2049      14.5799      .0000      2.5833      3.3926
ColorTP      .0723      .2898      .2494      .8033      -.5000      .6446

Standardized coefficients
      coeff
ColorTP      .0388

*****
OUTCOME VARIABLE:
Y1

Model Summary
      R      R-sq      MSE      F      df1      df2      p
      .2434      .0593      .9144      5.1340      2.0000      163.0000      .0069

Model
      coeff      se      t      p      LLCI      ULCI
constant      2.8220      .1591      17.7428      .0000      2.5080      3.1361
ColorTP      -.0213      .1485      -.1435      .8860      -.3145      .2719
M1      .1281      .0400      3.2033      .0016      .0491      .2071

Standardized coefficients
      coeff
ColorTP      -.0217
M1      .2434

```

Table A 44 - Robustness Test without Low Realism Answers – H3: Direct and Indirect Effects of X on Y - Process Model 4

```

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****
Direct effect of X on Y
  Effect      se      t      p      LLCI      ULCI      c'_ps
  -.0213     .1485    -.1435   .8860   -.3145    .2719    -.0217

Indirect effect(s) of X on Y:
  Effect      BootSE    BootLLCI   BootULCI
M1      .0093     .0392     -.0705     .0911

Partially standardized indirect effect(s) of X on Y:
  Effect      BootSE    BootLLCI   BootULCI
M1      .0095     .0400     -.0734     .0921
    
```

Table A 45 - Robustness Test without Wrong Attention Check Answers – H1: Test of Homogeneity of Variances - Oneway

Tests of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
PI	Based on Mean	2.352	3	189	.074
	Based on Median	2.354	3	189	.074
	Based on Median and with adjusted df	2.354	3	187.451	.074
	Based on trimmed mean	2.483	3	189	.062

Table A 46 - Robustness Test without Wrong Attention Check Answers – H1: ANOVA - Oneway

ANOVA					
PI					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.191	3	3.397	3.246	.023
Within Groups	197.809	189	1.047		
Total	208.000	192			

Table A 47 - Robustness Test without Wrong Attention Check Answers – H1: Descriptives - Oneway

Descriptives								
PI								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Red and Green	49	2.82	.905	.129	2.56	3.08	1	5
Red and Orange	49	3.22	1.141	.163	2.90	3.55	1	5
Blue and Orange	45	3.24	1.131	.169	2.90	3.58	1	5
Blue and Green	50	2.74	.899	.127	2.48	3.00	1	5
Total	193	3.00	1.041	.075	2.85	3.15	1	5

Table A 48 - Robustness Test without Wrong Attention Check Answers – H1: ANOVA Effect Sizes - Oneway

ANOVA Effect Sizes ^{a,b}				
PI				
		Point Estimate	95% Confidence Interval	
			Lower	Upper
PI	Eta-squared	.049	.000	.108
	Epsilon-squared	.034	-.016	.094
	Omega-squared Fixed-effect	.034	-.015	.094
	Omega-squared Random-effect	.012	-.005	.033

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

b. Negative but less biased estimates are retained, not rounded to zero.

Table A 49 - Robustness Test without Wrong Attention Check Answers – H1: Post Hoc Tests - Oneway

Post Hoc Tests

Multiple Comparisons

Dependent Variable: PI
Tukey HSD

(I) Packaging Color Combination	(J) Packaging Color Combination	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Red and Green	Red and Orange	-.408	.207	.201	-.94	.13
	Blue and Orange	-.428	.211	.182	-.98	.12
	Blue and Green	.076	.206	.983	-.46	.61
Red and Orange	Red and Green	.408	.207	.201	-.13	.94
	Blue and Orange	-.020	.211	1.000	-.57	.53
	Blue and Green	.484	.206	.089	-.05	1.02
Blue and Orange	Red and Green	.428	.211	.182	-.12	.98
	Red and Orange	.020	.211	1.000	-.53	.57
	Blue and Green	.504	.210	.081	-.04	1.05
Blue and Green	Red and Green	-.076	.206	.983	-.61	.46
	Red and Orange	-.484	.206	.089	-1.02	.05
	Blue and Orange	-.504	.210	.081	-1.05	.04

Table A 50 - Robustness Test without Wrong Attention Check Answers – H1a: Independent Sample T-Test

T-Test

Group Statistics

ColorTP	N	Mean	Std. Deviation	Std. Error Mean
PI Analogous	99	2.98	1.050	.105
PI Complementary	94	3.02	1.037	.107

Independent Samples Test

Levene's Test for Equality of Variances				t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
PI	Equal variances assumed	.048	.826	-.276	191	.391	.783	-.041	.150	-.338	.255
	Equal variances not assumed			-.276	190.698	.391	.783	-.041	.150	-.338	.255

Independent Samples Effect Sizes

	Standardizer ^a	Point Estimate	95% Confidence Interval	
			Lower	Upper
PI	Cohen's d	1.043	-.040	.243
	Hedges' correction	1.047	-.040	.242
	Glass's delta	1.037	-.040	.242

a. The denominator used in estimating the effect sizes. Cohen's d uses the pooled standard deviation. Hedges' correction uses the pooled standard deviation, plus a correction factor. Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Table A 51 - Robustness Test without Wrong Attention Check Answers – H2: Process Model 1

```
*****
Model : 1
Y : Y1
X : ColorTP
W : AVG_H

Sample
Size: 193

*****
OUTCOME VARIABLE:
Y1

Model Summary
R          R-sq      MSE      F(HC3)    df1      df2      p
.0475     .0023     1.0980   .1341     3.0000   189.0000 .9397

Model
      coeff    se(HC3)      t      p      LLCI      ULCI
constant  2.9828    .1075    27.7354 .0000    2.7707    3.1949
ColorTP   .0373     .1520     .2452   .8066    -.2626    .3371
AVG_H     .0754     .1399     .5392   .5904    -.2005    .3514
Int_1     -.0464     .2077    -.2234   .8235    -.4561    .3633

Product terms key:
Int_1 :      ColorTP x      AVG_H

Test(s) of highest order unconditional interaction(s):
R2-chng  F(HC3)    df1    df2    p
X*W      .0003     .0499    1.0000  189.0000 .8235
-----
Focal predict: ColorTP (X)
Mod var:      AVG_H (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.
```

Table A 52 - Robustness Test without Wrong Attention Check Answers – H3: Outcome Variable M1 and Y1 - Process Model 4

```

*****
OUTCOME VARIABLE:
M1
Model Summary
  R      R-sq      MSE      F      df1      df2      p
.0508  .0026      3.1463  .4947  1.0000  191.0000  .4827

Model
  coeff      se      t      p      LLCI      ULCI
constant  2.7778  .1783  15.5817  .0000  2.4261  3.1294
ColorTP   .1797   .2554   .7034   .4827  -.3242  .6835

Standardized coefficients
  coeff
ColorTP  .1014
*****
OUTCOME VARIABLE:
Y1
Model Summary
  R      R-sq      MSE      F      df1      df2      p
.2346  .0550      1.0345  5.5330  2.0000  190.0000  .0046

Model
  coeff      se      t      p      LLCI      ULCI
constant  2.5978  .1541  16.8631  .0000  2.2939  2.9017
ColorTP   .0168   .1467   .1143   .9091  -.2725  .3061
M1        .1375   .0415   3.3145  .0011  -.0557  .2194

Standardized coefficients
  coeff
ColorTP   .0161
M1        .2340

```

Table A 53 - Robustness Test without Wrong Attention Check Answers – H3: Direct and Indirect Effects of X on Y - Process Model 4

```

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****
Direct effect of X on Y
  Effect      se      t      p      LLCI      ULCI      c'_ps
.0168      .1467   .1143   .9091  -.2725  .3061   .0161

Indirect effect(s) of X on Y:
  Effect      BootSE      BootLLCI      BootULCI
M1      .0247      .0376      -.0447      .1069

Partially standardized indirect effect(s) of X on Y:
  Effect      BootSE      BootLLCI      BootULCI
M1      .0237      .0360      -.0437      .1022

```

Table A 54 - Robustness Test without Low Realism and Wrong Attention Check Answers – H1: Test of Homogeneity of Variances - Oneway

Tests of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
PI	Based on Mean	5.190	3	154	.002
	Based on Median	2.466	3	154	.064
	Based on Median and with adjusted df	2.466	3	139.233	.065
	Based on trimmed mean	5.133	3	154	.002

Table A 55 - Robustness Test without Low Realism and Wrong Attention Check Answers - H1: ANOVA - Oneway

ANOVA					
PI					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.695	3	2.232	2.449	.066
Within Groups	140.343	154	.911		
Total	147.038	157			

Table A 56 - Robustness Test without Low Realism and Wrong Attention Check Answers - H1: Descriptives - Oneway

Descriptives									
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	
					Lower Bound	Upper Bound			
Red and Green	40	2.98	.832	.131	2.71	3.24	1	5	
Red and Orange	42	3.43	1.039	.160	3.10	3.75	1	5	
Blue and Orange	37	3.32	1.132	.186	2.95	3.70	1	5	
Blue and Green	39	2.97	.778	.125	2.72	3.23	1	5	
Total	158	3.18	.968	.077	3.03	3.33	1	5	

Table A 57 - Robustness Test without Low Realism and Wrong Attention Check Answers - H1: ANOVA Effect Sizes - Oneway

ANOVA Effect Sizes ^{a,b}				
		Point Estimate	95% Confidence Interval	
			Lower	Upper
PI	Eta-squared	.046	.000	.109
	Epsilon-squared	.027	-.019	.092
	Omega-squared Fixed-effect	.027	-.019	.091
	Omega-squared Random-effect	.009	-.006	.032

- a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
- b. Negative but less biased estimates are retained, not rounded to zero.

Table A 58 - Robustness Test without Low Realism and Wrong Attention Check Answers - H1: Post Hoc Tests - Oneway

Post Hoc Tests							
Multiple Comparisons							
Dependent Variable: PI							
Tukey HSD							
(I) Packaging Color Combination	(J) Packaging Color Combination	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
					Lower Bound	Upper Bound	
Red and Green	Red and Orange	-.454	.211	.142	-1.00	.09	
	Blue and Orange	-.349	.218	.379	-.91	.22	
	Blue and Green	.001	.215	1.000	-.56	.56	
Red and Orange	Red and Green	.454	.211	.142	-.09	1.00	
	Blue and Orange	.104	.215	.962	-.45	.66	
	Blue and Green	.454	.212	.145	-.10	1.01	
Blue and Orange	Red and Green	.349	.218	.379	-.22	.91	
	Red and Orange	-.104	.215	.962	-.66	.45	
	Blue and Green	.350	.219	.383	-.22	.92	
Blue and Green	Red and Green	-.001	.215	1.000	-.56	.56	
	Red and Orange	-.454	.212	.145	-1.01	.10	
	Blue and Orange	-.350	.219	.383	-.92	.22	

Table A 59 - Robustness Test without Low Realism and Wrong Attention Check Answers - H1a: Independent Sample T-Test

T-Test											
Group Statistics											
ColorTP	N	Mean	Std. Deviation	Std. Error Mean							
PI Analogous	81	3.21	.945	.105							
PI Complementary	77	3.14	.996	.114							

Independent Samples Test											
Levene's Test for Equality of Variances				t-test for Equality of Means							
	F	Sig.	t	df	Significance One-Sided p	Significance Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
									Lower	Upper	
PI Equal variances assumed	.025	.873	.434	156	.332	.665	.067	.154	-.238	.372	
PI Equal variances not assumed			.433	154.340	.333	.665	.067	.155	-.238	.372	

Independent Samples Effect Sizes				
	Standardizer ^a	Point Estimate	95% Confidence Interval	
			Lower	Upper
PI Cohen's d	.970	.069	-.243	.381
Hedges' correction	.975	.069	-.242	.379
Glass's delta	.996	.067	-.245	.379

a. The denominator used in estimating the effect sizes. Cohen's d uses the pooled standard deviation. Hedges' correction uses the pooled standard deviation, plus a correction factor. Glass's delta uses the sample standard deviation of the control (i.e., the second) group.

Table A 60 - Robustness Test without Low Realism and Wrong Attention Check Answers - H2: Process Model 1

```

*****
Model : 1
Y : Y1
X : ColorTP
W : AVG_H

Sample
Size: 158

*****
OUTCOME VARIABLE:
Y1

Model Summary
      R      R-sq      MSE      F(HC3)      df1      df2      p
      .0463      .0021      .9527      .1175      3.0000      154.0000      .9497

Model
      coeff      se(HC3)      t      p      LLCI      ULCI
constant      3.2099      .1082      29.6764      .0000      2.9962      3.4236
ColorTP      -.0700      .1575      -.4446      .6572      -.3811      .2411
AVG_H      .0010      .1503      .0067      .9947      -.2959      .2979
Int_1      .0636      .2396      .2654      .7911      -.4097      .5369

Product terms key:
Int_1 :      ColorTP x      AVG_H

Test(s) of highest order unconditional interaction(s):
      R2-chng      F(HC3)      df1      df2      p
X*W      .0005      .0704      1.0000      154.0000      .7911
-----
      Focal predict: ColorTP (X)
      Mod var: AVG_H (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

```

Table A 61 - Robustness Test without Low Realism and Wrong Attention Check Answers - H2: Outcome Variable M1 and Y1 - Process Model 4

```

*****
Model : 4
Y : Y1
X : ColorTP
M : M1

Sample
Size: 158

*****
OUTCOME VARIABLE:
M1

Model Summary
      R      R-sq      MSE      F      df1      df2      p
      .0299      .0009      3.1687      .1395      1.0000      156.0000      .7093

Model
      coeff      se      t      p      LLCI      ULCI
constant      2.9630      .1978      14.9806      .0000      2.5723      3.3536
ColorTP      -.1058      .2833      -.3735      .7093      -.6655      .4538

Standardized coefficients
ColorTP      coeff      -.0596

*****
OUTCOME VARIABLE:
Y1

Model Summary
      R      R-sq      MSE      F      df1      df2      p
      .2443      .0597      .8920      4.9200      2.0000      155.0000      .0085

Model
      coeff      se      t      p      LLCI      ULCI
constant      2.8191      .1639      17.2027      .0000      2.4953      3.1428
ColorTP      -.0531      .1504      -.3528      .7247      -.3501      .2440
M1      .1319      .0425      3.1050      .0023      .0480      .2158

Standardized coefficients
ColorTP      coeff      -.0548
M1      .2420

```

Table A 62 - Robustness Test without Low Realism and Wrong Attention Check Answers - Direct and Indirect Effects of X on Y - Process Model 4

```

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****
Direct effect of X on Y
  Effect      se      t      p      LLCI      ULCI      c'_ps
-.0531      .1504     -.3528   .7247   -.3501     .2440    -.0548

Indirect effect(s) of X on Y:
  Effect      BootSE   BootLLCI   BootULCI
M1     -.0140     .0399     -.0953     .0666

Partially standardized indirect effect(s) of X on Y:
  Effect      BootSE   BootLLCI   BootULCI
M1     -.0144     .0414     -.1009     .0677

```