Fifty Shades of Red: The Influence of Value and Saturation of the Color Red in Instagram

Advertisements on Emotional Responses and Purchase Intentions

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Abstract

Research on the role of color in marketing has primarily focused on hue, so the impact of value and saturation on consumers' reactions to advertisements remains understudied. To address this gap in the research record, this thesis examines how changes in the value and saturation of the color red in Instagram advertisements affect consumers' emotional responses and purchase intentions. Drawing on color psychology and the S-O-R theoretical framework (Mehrabian & Russell, 1974), an experimental online survey was conducted to test the hypotheses that exposure to high value and high saturation would result in stronger purchase intentions, and that these relationships would be mediated by ad-induced increments in arousal and pleasure. In a 2 (value: low vs. high) x 2 (saturation: low vs. high) between-subjects design, $N = 88$ eligible participants were randomized to review five fictitious Instagram advertisements focusing on the hue red. Linear regression models and a mediation analysis suggested that high saturation positively influences ad-induced arousal and high value ad-induced pleasure, but only when combined with their low counterpart. Both high saturation and high value have a significant positive effect on purchase intentions, but when combined they lead to weaker purchase intentions. Lastly, ad-induced pleasure partially mediates the relationship of high value and the combination with high saturation on purchase intentions. The results underline the importance and complexity of the combination of value and saturation of the color red in Instagram advertisements on levels of ad-induced arousal, pleasure, and eventual purchase intentions.

Keywords: color psychology, sensory marketing, social media marketing, value, saturation, red, arousal, pleasure, S-O-R framework, Instagram advertising, purchase intentions

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Advertisements on Emotional Responses and Purchase Intentions

In recent decades, the development of digital marketing has become intertwined with technological progress. Digital marketing can be defined as the marketing of services and products by use of digital technologies without any time or location restrictions by use of internet and mobile phones (Desai, 2019). The applications that are extensively used in marketing to reach internet users are social media platforms such as Twitter, Facebook, and Instagram (Erlangga, 2021). Kaplan and Haenlein (2012) define such platforms as internet-based applications that facilitate the creation and exchange of user-generated content through the foundations of Web 2.0. Said platforms have drastically changed the ways in which consumers and marketers interact (Chaturvedi & Gupta, 2014).

Social Media Marketing

Through social media, consumers have been empowered with access to more information and new methods for evaluating and purchasing goods, which provides them with more influence over their market experience (Boyd et al., 2016; Constantinides, 2014). On top of that, there has been a shift in market dynamics, with an increase in online shopping on social media platforms (Talib & Saat, 2017). These changes require marketers to adapt the way they strategize and deploy their marketing practices (Alves et al., 2016), which is why it is important to study how to effectively use social media as a marketing tool to influence purchase behavior (Voramontri & Klieb, 2019). Strategies that utilize social network sites as a promotional tool for a business, product, or service, are defined as social media marketing (Guarda et al., 2021).

As of January 2023, Instagram is one of the most-used social network sites and a leading platform utilized by marketers, with over two billion active users a month (Dixon, 2023; Dencheva 2023). Users, including marketers, can post images and videos, which other users, including potential consumers, can engage with through liking or commenting (Casaló et al., 2021). But despite Instagram's growing popularity, academic research on this social media platform is scarce (Khan, 2018). What separates Instagram as a marketing tool from other social media platforms is the possibility of using a visuals-based strategy in order to effectively advertise products (Lim & Yazdanifard, 2014). Earlier research has already determined that visual aesthetics are one of the key determinants of advertisement effectiveness (Krishna et al., 2016) and greatly influences consumers decision making (Huang et al., 2023).

Sensory and Color-based Marketing

Given the relevance of visuals-based marketing, research interest in sensory marketing stimuli, such as those catering to sight (Šliburytė & Skėrytė, 2014), is increasing (Biswas et al., 2021). Sensory marketing "engages consumers' senses and affects their perception, judgment and behavior" (Krishna et al., 2016, p. 142). A key characteristic of human sight is the capability to distinguish colors (Bytyçi, 2020), which marketers take advantage of in order to attract attention and increase persuasion (Zhou et al., 2023). In fact, color has been found to play a larger role in the success of marketing a product than the product itself (Bytyçi, 2020). Given the importance and impact of color in advertising contexts, it would be expected that the field of color psychology is well-understood and developed (Lyu, 2022). However, color psychology still poses a challenge to marketing contexts (Bytyçi, 2020).

Color Psychology

Color has a strong psychological impact on the responses (i.e., the emotions, behaviors, and choices) of individuals (Bytyçi, 2020). Every person has unique emotional responses to each color, as they process colors in different wavelengths (Cunningham, 2017; Zailskaitė-Jakštė et al., 2017). Colors are the brain's interpretation of "light carried on wavelengths absorbed by the eyes" (Singh, 2006, p. 783). Colors associated with short wavelengths, like green and blue, are more calming and less arousing than long-wavelength colors such as red and yellow that cue excitement and high arousal (Lee & Andrade, 2010; Valdez & Mehrabian, 1994).

The color red in particular has gathered the interest of (marketing) scholars, as it is a universal primary color related to strong emotional responses, heightened levels of arousal (Piotrowski & Armstrong, 2012; Labrecque & Milne, 2011; Wilms & Oberfeld 2017) and induces physiological reactions like increased brain and heart activity (Singh, 2006). Red is a fierce, warm color with the longest wavelength within the electromagnetic spectrum and has a lively influence on different kinds of emotions (Singh & Srivastava, 2011). Scholars have found generalizable trends to long-wavelength hues since they are more psychologically activating as opposed to other colors (Broeder & Scherp, 2018). Consequently, red has been proven to be exciting and stimulating, two factors affecting pleasure and arousal (i.e., increased activation as well as sexual readiness) (Dael et al., 2016; Wexner, 1954). However, research has shown that red can also elicit negative feelings, like perceptions of danger (Dael et al., 2016).

Within marketing related research, Ye and colleagues (2020) examined the effect of red in promoting price savings and found that the use of red signals a perception of higher savings to consumers, which could explain why studies tend to prefer the hue of red in marketing communication (Wauters et al., 2014). Other researchers focused on the influence of red on brand trust, with red being perceived as less trustworthy than the color blue (Su et al., 2019). But

surprisingly few studies have researched the ways color, or particularly red, can influence consumers' purchase intentions (Labrecque & Milne, 2011). While these studies show the important effects of the hue red in consumer emotions, its relationship between affective judgements of individuals is actually weaker when compared to value and saturation (Zieliński, 2016). That is why it is important to study how the effects of red on consumer affective responses and purchase intentions vary across different combinations of value and saturation.

Most of the extant research body has focused on the hue of a color, that is, on a unique spectral wavelength visible to the eye (Labrecque, 2020). The other two dimensions of color - value and saturation (Zhou et al., 2023) – have not been taken into equal consideration, despite their high relevance for conducting color-based research (Labrecque, 2020). Labrecque and Patrick (2013) suggest that value and saturation might even be more important to take into consideration than hue and that past research into hue may be unreliable because value and saturation were not properly controlled for (ibid.; also see Labrecque, 2020). Therefore, Panigyrakis and Kyrousi (2015) call for more research into the effect of the three color dimensions on individuals' emotional responses. Emotional responses, in turn, play an important role in the decision-making process of consumers, which directly impacts purchase intentions (Anastasiei & Chiosa, 2014). That is why the present experiment examines the effects of value and saturation of the hue red on emotional responses and purchase intentions. Because Yu and colleagues (2020) emphasize the importance of studying how changes in value and saturation affect Instagram users in particular, Instagram is chosen as the study context, leading to the following research question:

To what extent do alternate combinations of saturation and value of the hue red influence emotional responses and purchase intentions to an Instagram advertisement?

Theoretical Background

Consumer Emotions and S-O-R Framework

Emotions reflect a "mental experience with high intensity and high hedonic content (pleasure/displeasure)" (Cabanac, 2002, p. 69) that serves as a primary drive of consumer purchase behavior (Soodan & Pandey, 2016). Two emotional dimensions, pleasure and arousal, inform how consumers react to advertisements (Holbrook & Batra, 1987), which makes these dimensions important tools for marketers (Soodan & Pandey, 2016). Pleasure is an emotional state that spans extreme unhappiness and extreme happiness, whereas arousal spans sleep and frenzied excitement (Russell & Mehrabian, 1977). More specifically, pleasure revolves around whether a person experiences the environment as enjoyable or not, whereas arousal refers to the degree to which a person is stimulated or not (Hall et al., 2017).

These two emotions have been defined by Mehrabian and Russell (1974) as the PAD descriptors, consisting of Pleasure, Arousal, and Dominance. Compared to the other two, dominance has received significantly less scholarly attention, because it does not appear to directly impact consumer behavior (Bakker et al., 2014; Donovan et al., 1994) and does not lend itself well to online research (Ha & Lennon, 2010). That is why the present study focuses solely on pleasure and arousal as the emotional descriptors. In order to better understand the roles and influences of pleasure and arousal, this thesis draws on the Stimulus-Organism-Response (S-O-R) framework by Mehrabian and Russell (1974). A stimulus (S) such as social media exposure (Lazaris et al., 2022) or exposure to a color (Peng & Kim, 2014) is thought to influence the affective states of an organism (O), which in turn prompts a behavioral response (R; Kühn & Petzer (2018). For instance, social media stimuli have been shown to heighten arousal, which in turn heightens purchase intentions (Lazaris et al., 2022).

Purchase Intentions

Within the S-O-R framework, purchase intentions reflect the response (R) component (Kühn & Petzer, 2018). In online shopping contexts, such as the one created by Instagram, design elements can affect consumers' pleasure and arousal levels (Eroğlu et al., 2003), which then inform purchase intentions (Chang et al., 2014; Ha & Lennon, 2010; also see Suprapto et al., 2020, for results related to product attractiveness). Defined as the readiness of a person to purchase an item (Doan, 2020), purchase intentions are a direct predictor of purchases made (Ali et al., 2011).

Color Dimensions

Saturation

Saturation relates to the amount of intensity or richness of a color (Labrecque, 2020) and determines which colors will appear vivid and warm versus gray, washed out, and cool (Labrecque & Milne, 2011; Valdez & Mehrabian, 1994). Consumers ascribe more importance to saturation than other color attributes (Pichierri & Pino, 2023). Fittingly, changes in emotion have been linked to changes in saturation (Manav, 2007; Valdez & Mehrabian, 1994), with higher levels of saturation being linked to higher levels of pleasure and arousal (Gorn et al., 1997; Suk & Irtel, 2009; Valdez & Mehrabian, 1994; White et al., 2021). These effects can be explained due to high saturated colors containing more hue pigment and therefore appearing richer and more prominent (Valdez & Mehrabian, 1994), with this contrast being even more pronounced in online or screen contexts than in in-person ones (Golding & White, 1997; Gorn et al., 2004). More saturated colors are typically rated as more likeable and as likely to increase purchase intentions (Gorn et al., 1997; White et al., 2021), although marketers should be mindful of unintended negative effects of highly saturated colors (Skulmowski et al., 2016).

Whereas hedonic shoppers (who gain satisfaction from shopping) report higher levels of pleasure when exposed to high levels of saturation, task-oriented shoppers (who want to complete the shopping task with the least effort possible) report lower levels of pleasure when exposed to high levels of saturation (Kaltcheva & Weiz, 2006). Hedonic shopping is categorized by its reflection of emotional worth, partly specified by arousal (Peng & Kim, 2014). Previous research has established that both arousal and pleasure are positively related to hedonic values (Babin et al., 1994), where pleasure increases hedonic values by entertainment or product gain, while arousal presents itself as an exciting experience in, for example, an online web site setting (Wang et al., 2007). These different shopping behaviors, based on motivations, can result in differences in purchase intentions relying on the levels of product involvement, where consumers tend to focus less attention and effort on the product when it is a low-involvement product. That is part of the reason why the products depicted within the experiment of this study will be household products, examples of low-involvement products that are more likely to attract individuals by emotional appeals (Weismueller et al., 2020). Following this body of literature, it is expected that:

H1a: High saturation is associated with higher levels of ad-induced arousal and pleasure. Extrapolating from the assumptions of the S-O-R Framework, higher levels of arousal and pleasure (among the organism (O) component of the model) should be tied to a behavioral response (R), specifically gains in purchase intentions. It is therefore also assumed that:

H1b: High saturation is associated with stronger purchase intentions.

Value

Value refers to the lightness or darkness of a color, that is, the levels of white, as opposed to black, that are present in a hue (Labrecque, 2020). A high value color entails a higher amount

of white, whereas a low value color seems to have been mixed with black (Labrecque & Milne, 2011). Colors with high value tend to be perceived as cool colors (Valdez & Mehrabian, 1994) and are associated with higher levels of pleasure (Adams & Osgood, 1973). In general, a 'brightness bias' leads people to evaluate brightness, such as images with higher value levels or brightness-based metaphors, more positively (Lakens et al., 2013; Specker et al., 2018).

In contrast to the clearly positive relationship between value and pleasure, the relationship between value and arousal is less straightforward. While some suggest a higher value is linked to higher levels of arousal (Wilms & Oberfeld, 2017), others report a U-shaped relationship between value and arousal. According to two studies, arousal decreases as value increases, but only until a certain point is reached and the relationship reverses (Suk & Irtel, 2009; Valdez & Mehrabian, 1994). Yet other research suggests that higher value colors achieve a calming or relaxing effect that is linked to lower levels of arousal (Gorn et al., 1997; Labrecque & Milne, 2011)

When assessing the relationship between value and arousal, it is also important to take saturation into account. Suk and Irtel (2009) argue that the positive relationship between saturation and arousal can likely be ascribed to the effect value has on arousal. Furthermore, the combination of maximum saturation and maximum value is rated more preferably than other possible combinations of the two (Camgöz, 2002). That is why the following hypothesis is formulated as:

H2a: High value is associated with higher levels of ad-induced arousal and pleasure.
Again, drawing on the link proposed between organism (O) components such as arousal and pleasure and subsequent reactions (R) such as purchase intentions within the S-O-R framework, the following hypothesis is derived:

H2b: High value is associated with stronger purchase intentions.

The Mediating Effect of Arousal and Pleasure on Purchase Intention

Considering extant literature on value, saturation, and the PAD descriptors pleasure and arousal within the S-O-R framework, it is expected that higher levels of arousal and pleasure are positively related to purchase intentions:

H3a: High levels of ad-induced arousal are associated with stronger purchase intentions.

H3b: High levels of ad-induced pleasure are associated with stronger purchase intentions.

Moreover, previous research on the influence of online atmospheric cues, like color, on emotions and purchase intentions have found a mediation effect of arousal and pleasure (Laroche et al., 2022). That is why it is expected that arousal and pleasure mediate the relationship between different combinations of value and saturation of the color red and subsequent purchase intentions, leading to the following hypothesis:

H4: Ad-induced arousal and pleasure have a mediating effect on the relationship between value and saturation on purchase intentions.

Covariates

Baseline and Ideal Affect

On top of the focal independent variables (value, saturation), mediating variables (arousal, pleasure), and dependent variable (purchase intentions), there are multiple relevant covariates that need to be considered. While most research focuses on the emotional states that people actually experience, it is also important to consider an individual's desired emotions (Tsai, 2007). Discrepancies between one's actual and desired affect motivate individuals to take actions that achieve ideal affect and resolve this discrepancy (ibid.). Although most people desire positive affect, the desired feeling can vary between high and low levels of arousal or pleasure

(Kuppens, 2008; Scheibe et al., 2013). Given interindividual differences in the desirability of different levels of arousal and pleasure, it is important to consider ideal affect when studying how value and saturation affect emotions.

Color Preference, Suitability, and Baseline Product Attractiveness

Consumers' personal color preferences have an influence on both emotional responses (Gong et al., 2017) and purchase intentions (Yu et al., 2022), since individuals are more likely to purchase a product when the color matches their color preference (Westland & Shin, 2015). Thus, individual differences in color preference need to be taken into account.

Likewise, purchase intentions are influenced by whether or not a 'correct' color selection is made (Hunjet & Vuk, 2017). The correct usage and suitability of a color in an advertisement can have strong effects on consumer emotions and persuasion psychology (Kim & Sung, 2013). Therefore, the present thesis will evaluate how well different combinations of value and saturation of the hue red 'match' the presented stimulus material (i.e., the chosen products).

Finally, this thesis will account for the baseline product attractiveness of the chosen stimuli (products), as the attractiveness of a product can bias consumers emotional responses and purchase intentions (Chang et al., 2014; Ferdinand & Fitriani, 2015). As a result, it is important to consider baseline product attractiveness as a potential confounding variable.

Age and Gender

Which emotions a color evokes differs between age groups (Terwogt & Hoeksma, 1995). For example, older adults' affect is less impacted by lighter colors and this demographic rate highly saturated colors as less appealing than younger adults do (Ou et al., 2011). Older adults voice stronger preferences for the color red than is the case among younger adults (Lee et al.,

2009), possibly due to age-related decrements in in eyesight and cognitive processing (Men et al., 2013).

In a similar vein, emotional responses to color can differ between genders (Manav, 2007), with girls evaluating the color red as 'unhappy,' whereas boys rate red as a 'happy' color (Pope et al., 2012). Moreover, women have a higher preference for reddish colors, where men prefer blueish colors (Hurlbert & Ling, 2007). To account for these demographic differences, the present study will limit participant age to 34 and assess both age and gender as potential confounding variables.

Conceptual Model

Following the above hypotheses and theoretical framework, a conceptual model was formulated (Figure 1). It depicts a schematic representation of the relationships between independent variable, mediators, and the dependent variable purchase intentions.

Figure 1

Conceptual model
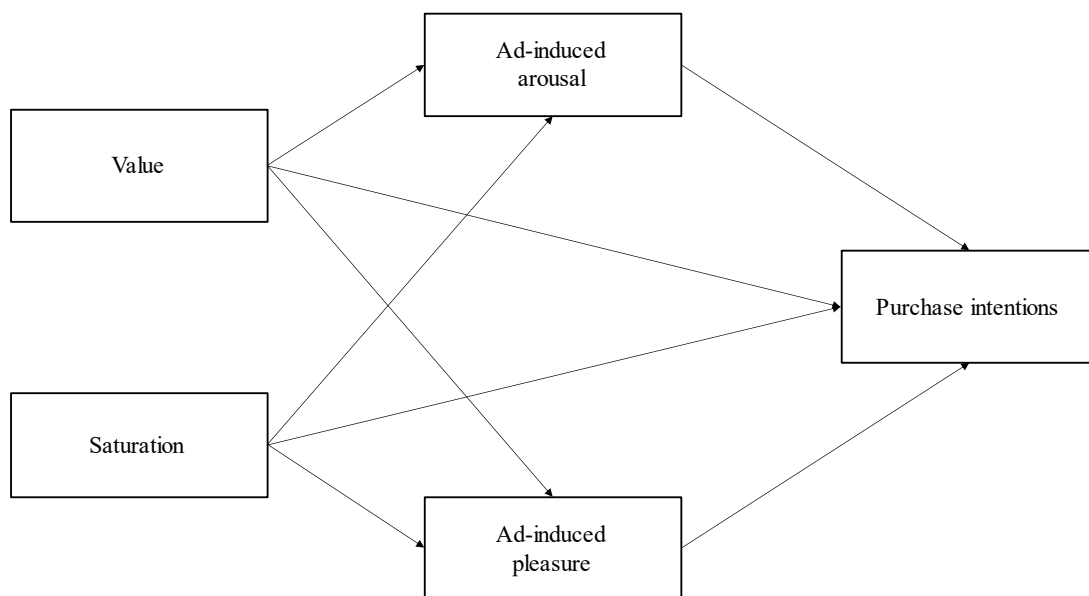
Method

Design

To address the hypotheses and research question, an experimental 2x2 between-subjects factorial design was used in which participants were randomized to one of the four experimental groups: low value - low saturation (LVLS) of red, high value - high saturation (HVHS) of red, high value - low saturation (HVLS) of red, and low value - high saturation (LVHS) of red. That way, causal evaluations concerning the effects of value and saturation can be made (Charness et al., 2012). Within this design, value and saturation served as the independent variables, ad-induced pleasure and arousal as both dependent and mediator variables, and purchase intentions functioned as the ultimate dependent variable. Additionally, age, gender, baseline affect, ideal affect, color preference, color suitability, and baseline product attractiveness were considered as covariate variables. Quantitative data were collected by means of a self-administered online Qualtrics.com questionnaire, administered in English.

To determine the sample size needed for the proposed design, an a priori power analysis was conducted using G*Power 3.1.9.7. Aiming at a medium effect size of .15, a significance level of .05, and power of .80, the required sample size for a linear multiple regression (i.e., Fixed Model, R^2 increase) with 16 total tested predictors is $N = 143$. To reach this sample size, a non-probability recruitment method, convenience sampling, was used (Etikan et al., 2016). An invitation to participate in the online questionnaire was sent out to the author's acquaintances via WhatsApp, Facebook, Instagram, and on various survey exchange platforms. Additionally, participants themselves were asked to distribute the questionnaire to their networks, if possible.

Participants

A total of $N = 154$ participants responded to the survey between November 15, 2023, and December 5, 2023. Of these, $n = 61$ partially completed surveys and were excluded from data analysis.[1] The target group consisted of the most active group of Instagram users, aged 18 through 34 years (Dixon, 2023; Dencheva 2023). Participants who fell outside of this age range ($n = 1$), were not proficient in English ($n = 1$) and did not use Instagram ($n = 3$) were excluded. No participants stated that they suffer from color blindness or other color-based visual impairments, and everyone indicated that they had been exposed to the visual stimuli. The final sample consisted of $N = 88$ eligible participants (57% women, 42% men), most of which were similar in age ranging from 19 through 31 ($M = 24.40$, $SD = 2.35$). Descriptive statistics of the complete sample can be found in Table 1.

Participants were divided per condition as follows: LVLS $N = 21$, HVHS $N = 23$, HVLS $N = 19$, LVHS $N = 25$. A one-way ANOVA analysis showed that participants did not significantly differ in the background variables age, gender, baseline affect, ideal affect, baseline product attractiveness or color suitability between conditions. However, participants did significantly differ between conditions with regards to color preference, $F(3,45.74) = 6.82$, $p <$ .001. A Tukey post-hoc test showed that the combination of LVHS received the highest mean of color preference which significantly differed from the mean scores of LVLS ($MD = –27.64$, $p =$ .004) and HVHS ($MD = –30.71$, $p < .001$), but not from HVLS ($MD = –8.56$, $p = .723$). An overview of all descriptive statistics specified per condition can be found in Table 2.

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[1] As per consent form wording, participants were free to discontinue their participation at any time. Because it was not possible to determine which participants had discontinued the survey and which had merely paused it, all incomplete surveys were treated as cases of revoked consent.

Table 1

Descriptive statistics

Variable	*N*	Minimum	Maximum	*M*	*SD*
Age	88	19.00	31.00	24.40	2.35
Gender [a]	88	1.00	3.00	1.59	0.52
Baseline Arousal	88	1.50	5.75	3.33	0.81
Baseline Pleasure	88	2.00	7.00	4.58	1.00
Ideal Affect Arousal	88	2.00	6.75	4.53	1.02
Ideal Affect Pleasure	88	1.25	7.00	5.26	1.34
Ad-induced Arousal	88	1.35	5.90	3.63	1.03
Ad-induced Pleasure	88	1.20	5.40	3.21	1.02
Purchase Intentions	88	3.27	9.27	5.93	1.35
Color Preference	88	0.00	100.00	43.41	29.55
Color Suitability	88	0.00	100.00	21.85	26.94
Baseline Product Attractiveness	88	1.00	4.60	2.84	0.68

[a] 1 = Male, 2 = Female, 3 = Other

Table 2

Descriptive statistics per condition

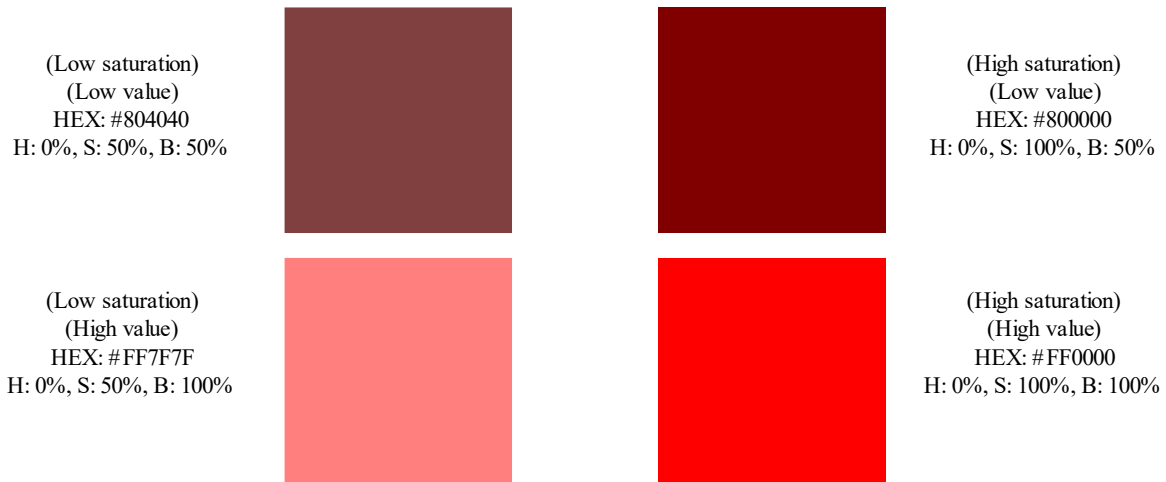| Variable		LVLS			HVHS			HVLS			LVHS	
	N	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Age	21	23.62	2.44	23	24.91	1.88	19	24.74	2.35	25	24.32	2.59
Gender[a]	21	1.67	0.58	23	1.61	0.50	19	1.42	0.51	25	1.64	0.49
Baseline Arousal	21	3.37	0.74	23	3.16	0.91	19	3.22	0.76	25	3.53	0.79
Baseline Pleasure	21	4.62	0.91	23	4.50	1.06	19	4.55	1.03	25	4.63	1.03
Ideal Affect Arousal	21	4.55	0.85	23	4.57	0.95	19	4.41	1.06	25	4.56	1.21
Ideal Affect Pleasure	21	5.18	1.08	23	5.18	1.63	19	5.38	1.49	25	5.31	1.19
Ad-induced Arousal	21	3.10	0.84	23	4.29	1.00	19	3.37	1.04	25	3.66	0.90
Ad-induced Pleasure	21	2.96	0.76	23	2.81	1.08	19	3.63	1.00	25	3.49	1.03
Purchase Intentions	21	4.74	1.25	23	6.02	1.08	19	6.42	1.12	25	6.46	1.24
Color Preference	21	32.24	25.29	23	29.17	26.84	19	51.32	27.89	25	59.88	27.44
Color Suitability	21	22.19	27.79	23	13.13	24.40	19	28.11	25.59	25	25.96	28.96
Baseline Product Attractiveness	21	2.93	0.71	23	2.66	0.75	19	2.87	0.45	25	2.89	0.75

[a] 1 = Male, 2 = Female, 3 = Other

Materials

In each of the four experimental conditions, participants were exposed to a fictitious Instagram advertisement, created using the online editor Code Beautify. Advertisements lacked likes and comments to avoid biasing purchase intentions (Yasa & Cop, 2022). To enhance external validity, advertisements featured low-involvement products similar in price range (Weismueller et al., 2020) and targeting a wide range of consumers (Gbadamosi, 2009; Weismueller et al., 2020). Following Zhou and colleagues (2023), a fictitious personal care brand named 'JustCare' was created to minimize the influence of potential brand confounds. A total of five low-involvement products were displayed to each participant, consisting of toothpaste, shampoo, laundry detergent, soap, and air freshener (see Kuenzel & Musters, 2007). The independent variables value and saturation are constructed as directed by Labrecque (2020). Product images were collected from Vecteezy and edited in Microsoft PowerPoint and Adobe Photoshop CC 2019. As displayed in Figure 2, the stimuli were drawn in the hue red (#FF0000, H: 0%, S:100% & B:100%) with varying levels of value (low value: 50% vs. high value: 100%) and saturation (low saturation: 50% vs high saturation: 100%).[2] When manipulating either value or saturation, the other of the two is held constant. All final stimuli materials can be found in Appendix A.

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[2] For each of the conditions, the levels of value and saturation were allowed to deviate across the stimulus (e.g., in areas with shadow etc.) to provide better visual contrast. While this allows exact color codes to differ somewhat, the dominant color of each image contains the same saturation and value levels as shown in Figure 2.

Figure 2

Color Manipulation for Value and Saturation of the Hue Red (Including HSB Color Space and

HEX Codes)

(Low saturation)
(Low value)
HEX: #804040
H: 0%, S: 50%, B: 50%

(High saturation)
(Low value)
HEX: #800000
H: 0%, S: 100%, B: 50%

(Low saturation)
(High value)
HEX: #FF7F7F
H: 0%, S: 50%, B: 100%

(High saturation)
(High value)
HEX: #FF0000
H: 0%, S: 100%, B: 100%

Conditions were used to create three dummy variables (HS, HV, and HSHV; coded as 1),

with condition LVLS serving as the reference condition (coded as 0).

Measures

Demographic Background and Eligibility

Participants indicated their age (open text), gender (i.e., 1 = *man*, 2 = *woman,* or 3 = an

open-ended option), any color blindness or other color-based visual impairments (yes or no),

level of English proficiency (yes or no), and Instagram usage (yes or no). Eligible participants

also reported time spent on Instagram using a 6-point scale (i.e., 1 = *10 minutes or less*, 2 = *11–*

30 minutes, 3 = *31–60 minutes*, 4 = *1–2 hours*, 5 = *2–3 hours*, or 6 = *3 hours or more*)

formulated by Lup and colleagues (2015).

Baseline Affect

Participants specified their baseline arousal and pleasure in response to the question *'At*

this moment I feel:' (adapted from Wang et al., 2007). Arousal was measured on a 5-item, 7-

point contrasting adjective semantic differential scale (*relaxed – stimulated, unaroused –*

aroused, frenzied – sluggish, calm – excited, and *sleepy – wide awake).* A reliability analysis of the five items resulted in an unacceptable Cronbach's Alpha ($\alpha = .17$), due to the negative correlation of item *frenzied – sluggish* with the rest of the scale. Contrary to the approach taken by Wang and colleagues (2007), *frenzied – sluggish* was reverse-coded in the present study. However, this resulted in reliability complications amongst most other variables that contained this item, resulting in the exclusion of the item in the computing of all arousal-based variables. The remaining items were averaged and combined to index baseline arousal ($\alpha = .48$). Baseline pleasure was measured on a 4-item, 7-point contrasting adjective semantic differential scale (*unhappy – happy, annoyed – pleased, not contented – contented,* and *despairing – hopeful).* The reliability of these items was acceptable ($\alpha = .84$), so they were averaged and combined to index baseline affect pleasure.

Ideal Affect

Participants described their ideal affect in response to the question *'After seeing an advertisement, how much would you like to feel the following emotions?'* This question was identical for both arousal and pleasure, with the same scale and items used when assessing baseline affect. The reliability analysis gave an acceptable result for both arousal ($\alpha = .69$) and pleasure ($\alpha = .93$). All items were then averaged into ideal affect arousal and pleasure variables.

Ad-Induced Affect

For each of the five stimuli, ad-induced arousal and pleasure were assessed with the question *'After seeing this advertisement I felt:'.* Both the measurements and items for arousal and pleasure were identical to the ones listed for baseline affect and ideal affect. Cronbach's alphas for arousal (αs = .92–96) and pleasure (αs = .92–98) were high across conditions, so items

were averaged and combined to create indices of ad-induced arousal and pleasure.

Purchase Intentions

Sensu Hutter and Hoffmann (2014), ad-induced purchase intentions was measured on a 3-item, 7-point Likert scale preceded by the questions *'After seeing this advertisement I...'* (i.e., *'I would purchase this product', 'I'm considering purchasing this product', and 'I wouldn't purchase this product'* (reverse-coded)). Response options ranged from 1 = *strongly disagree* to 7 = *strongly agree* (αs = .95–.98). Items were averaged and combined into a single variable.

Color Preference

To assess color preference, participants were asked *'How much do you like this color?'* with an image of the four different colors used across conditions (Figure 2). Underneath each separate color square, a continuous line-mark slider scale was presented, with values ranging from 0 = *not at all* to 100 = *very much* (adapted from Schloss et al., 2012; α = .50). Analyses only examined participants' preference for the color that participants saw in their respective condition.

Color Suitability

To check how well the color might match the products in the condition each participant saw, participants were asked *'How well did the color match the products?'*, using the same continuous line-mark slider scale as used to measure color preference. Per person, a single-item index was computed by combining the information from each of the four conditions.

Baseline Product Attractiveness

To account for the fact that regardless of color, the reviewed products might elicit ceiling or floor effects, participants were presented with the five reviewed products in their original colorless state. Participants were asked, *'Thinking about this advertisement for the product from*

JustCare, which of the following statements best describes your feeling about the

advertisement?' Each individual then responded to a 5-item, 5-point Likert scale with answer

options ranging from 1 = *I disliked it very much* to 5 = I *liked it very much* (adapted from

Bergkvist & Rossiter, 2008). Responses were averaged across items (α = .78).

Color Manipulation

To verify if participants paid attention to the images and remembered what the dominant

color was they were presented with, participants responded to the question *'What was the*

dominant color of the Instagram advertisement images that you evaluated?' The answer options

consisted of four images of the different hues of each condition (Figure 2) and the option to

instead report issues with the display of study materials (i.e., *I did not see any color in the*

Instagram advertisements images and *I could not see the Instagram advertisement images*).

Procedure

After providing informed consent, participants responded to questions about their

demographic background and survey eligibility before reporting on their baseline and ideal

affect. After being randomized to one of the four conditions, participants were presented with the

five visual stimuli in randomized order. In response to each stimulus, participants described their

ad-induced affect and purchase intentions. To guarantee that participants saw and paid sufficient

attention to the advertisements, participants were forced to wait a minimum of five seconds

before being able to utilize the 'continue' button. After reviewing all stimuli, participants were

asked to choose the dominant color they saw in their condition (or, if applicable, to indicate that

no visual stimuli could be displayed on their device). This color manipulation check indicated

that most participants chose the correct dominant color, but *n* = 8 participants chose a different

color than the one referenced within their conditions. These participants were still included in the

analyses, due to sample size and power concerns. To gain more insight into the effect of the combination of colors with products, participants were asked about their color preference, perceived color suitability, and baseline product attractiveness. Lastly, the participants were thanked for their time and were prompted to leave comments or reach out to the experimenters, if necessary. A transcript of the questionnaire for one of the four conditions, can be found in Supplement B.

Analyses

For the purpose of answering the hypotheses and testing the conceptual model proposed in Figure 1, several analyses were conducted using the statistical program jamovi, version 2.3.28. Based on the model, two separate multiple linear regression models were tested, one multiple linear regression with three blocks and one mediation model. The mediation model was performed by use of the GLM Mediation Model, provided in the Advanced Mediation Model package for jamovi (Galluci, 2020).

<div align="center">Results</div>

H1a: High Saturation is Associated with Higher Levels of Ad-Induced Arousal and Pleasure

H2a: High Value is Associated with Higher Levels of Ad-Induced Arousal and Pleasure

Ad-Induced Arousal

To test hypotheses H1a and H2a with respect to arousal, ad-induced arousal was regressed on the three dummy variables encoding value and saturation conditions. Changes in value and saturation significantly explained the variation in ad-induced arousal, $F(3, 84) = 6.44$, $p < .001$, $R^2 = .19$. Within this model, exposure to high saturation was significantly linked to higher levels of ad-induced arousal, $\beta = .54$, $p = .048$. However, this was only the case when

high saturation was paired with a low value and not when paired with a high value, $\beta = .35$, $p = .375$. There was no significant influence of a high value on ad-induced arousal, $\beta = .26$, $p = .372$. These results partly confirm H1a and reject H2a, suggesting that a specific combination of high saturation and low value may heighten arousal.

Ad-Induced Pleasure

To test hypotheses H1a and H2a with respect to pleasure, ad-induced pleasure was regressed on the three dummy variables encoding value and saturation conditions. Value and saturation significantly explained variations in ad-induced pleasure, $F(3, 84) = 3.60$, $p = .017$, $R^2 = .11$. Results indicate that exposure to high value is associated with higher levels of ad-induced pleasure, $\beta = .66$, $p = .033$, but only in connection with low saturation. Interestingly, when high value was combined with high saturation, participants reported lower levels of ad-induced pleasure, $\beta = -1.32$, $p = .002$. No significant effect of high saturation on ad-induced pleasure was found, $\beta = .52$, $p = .070$. Therefore, we observe no support for H1a but partial support for H2a, again showcasing the differences in emotional responses to combinations of value and saturation.

H1b: High Saturation is Associated with Stronger Purchase Intentions

H2b: High Value is Associated with Stronger Purchase Intentions

To evaluate hypotheses H1b and H2b, purchase intentions were additively regressed on three blocks of predictors. In a first model, the three dummy variables served as predictors. Changes in value and saturation significantly explained the variation in purchase intentions, $F(3, 84) = 9.98$, $p < .001$, $R^2 = .26$. Both high value and high saturation were significantly linked to stronger purchase intentions, $\beta = 1.24$, $p < .001$ and $\beta = 1.28$, $p < .001$, respectively. However, purchase intentions were weaker when combining high value and high saturation, $\beta = -1.57$, $p <$

.001. These results support H1b and H2b for cases in which a high value is combined with low saturation, and vice versa.

H3a: High Levels of Ad-Induced Arousal are Associated with Stronger Purchase Intentions

H3b: High Levels of Ad-Induced Pleasure are Associated with Stronger Purchase Intentions

To evaluate hypotheses H3a and H3b, ad-induced arousal and pleasure were added as predictors in the second model, $F(5, 82) = 25.03$, $p < .001$, $R^2 = .60$. The patterns observed with respect to value and saturation remained intact. In contrast to ad-induced arousal, ad-induced pleasure was associated with stronger purchase intentions, $\beta = .60$, $p < .001$. These results are in line with H3b but not with H3a.

Role of Covariate Measures

After adding all other covariates in model 3, the patterns observed in the context of model 2 remained similar, $F(14, 73) = 11.49$, $p < .001$, $R^2 = .69$. The only covariate that was meaningfully related to purchase intentions was color suitability, with purchase intentions being stronger when the presented color was perceived as more suitable for the product in question, $\beta = .17$, $p = .032$. All other results can be found in Table 3.

Table 3

Linear Mixed Models 1, 2 and 3 Predicting Purchase Intentions Based on Value, Saturation, Ad-Induced Arousal, Ad-Induced

Pleasure, Baseline Affect, Ideal Affect, Color Preference, Color Suitability, Baseline Product Attractiveness, Age and Gender

Predictor	Model 1		Model 2		Model 3	
	β (SE)	p	β (SE)	p	β (SE)	p
Intercept [a]	b = 4.74 (.26)	< .001***	b = 2.06 (.43)	< .001***	b = 1.61 (1.38)	.249
High saturation	1.28 (.35)	< .001***	.92 (.27)	< .001***	.93 (.28)	< .001***
High value	1.24 (.37)	< .001***	.83 (.28)	< .001***	.80 (.28)	< .001***
High value/high saturation	−1.57 (.50)	< .001***	−.82 (.40)	.008**	−.64 (.42)	.042*
Ad-induced arousal			.09 (.10)	.252	−.004 (.11)	.966
Ad-induced pleasure			.60 (.10)	< .001***	.51 (.10)	< .001***
Baseline arousal					−.11 (.12)	.128
Baseline pleasure					.10 (.09)	.150
Ideal affect arousal					.09 (.09)	.199
Ideal affect pleasure					−.07 (.08)	.367
Color preference					.09 (.004)	.283
Color suitability					.17 (.004)	.032*
Baseline product attractiveness					.11 (.14)	.146
Age					.03 (.04)	.693
Gender					−.07 (.21)	.383

[a] Represents reference level (i.e., LVLS)

Note. High saturation is assessed through the grouping condition variables "dummy HS" (0 = not in condition, 1 = in condition); High value "dummy HV" (0 = not in condition, 1 = in condition); High value/High saturation "HVHS" (0 = not in condition, 1 = in condition)

* $p < .05$. ** $p < .01$. *** $p < .001$.

H4: Ad-Induced Arousal and Pleasure Have a Mediating Effect on the Relationship

Between Value and Saturation on Purchase Intentions

To evaluate hypothesis H4, a mediation analysis was conducted using purchase intentions as the dependent variable, ad-induced arousal and ad-induced pleasure as the mediating variables, and the three dummy variables for value and saturation as factor. Two partial mediations were observed.

High Value → Ad-Induced Pleasure → Purchase Intentions

First, ad-induced pleasure partially mediated the relationship between exposure to high value and purchase intentions. There was both a direct effect of high value → purchase intentions, $\beta = .42$, 95% CI [.58, 1.65], $p < .001$, as well as an indirect one via high value → ad-induced pleasure → purchase intentions, $\beta = .20$, 95% CI [.04, 1.01], $p = .033$. Both the component effect of Path A (i.e., high value → ad-induced pleasure), $\beta = .33$, 95% CI [.08, 1.27], $p = .027$, and path B (i.e., ad-induced pleasure → purchase intentions), $\beta = .60$, 95% CI [.59, .97], $p < .001$, were significant as well. Because the total effect of high value → purchase intentions, $\beta = .63$, 95% CI [.96, 2.39], $p < .001$, returned a significant p-value, only partial mediation was observed.

High Value/High Saturation → Ad-Induced Pleasure → Purchase Intentions
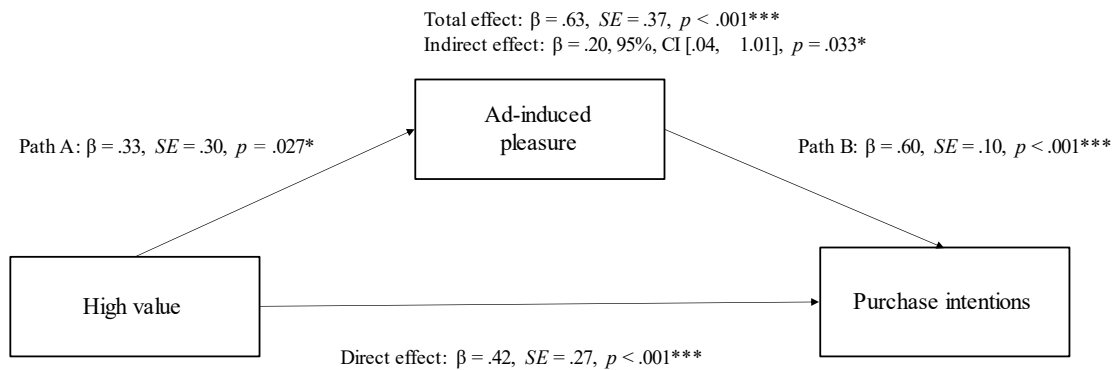
Second, a similar pattern of results could be found in the relationship between high value/high saturation, ad-induced pleasure, and purchase intentions. Ad-induced pleasure partially mediated the link between high value/high saturation and purchase intentions. There was both a direct effect of high value/high saturation → purchase intentions, $\beta = -.36$, 95% CI [−1.86, −.34], $p < .005$, as well as an indirect effect of high value/high saturation → ad-induced pleasure → purchase intentions, $\beta = -.35$, 95% CI [−1.74, −.38], $p = .002$. Both the component

effect of Path B (i.e., ad-induced pleasure → purchase intentions), β = .60, 95% CI [.59, .97], *p <*

.001, and Path C (high value/high saturation → ad-induced pleasure), β = –.59, 95% CI [–2.16, –

.55], *p* < .001, were significant as well. Because the total effect of high value/high saturation →

purchase intentions, β = –.70, 95% CI [–3.09, –1.15], *p* < .001, returned a significant *p*-value,

only partial mediation was observed.

Together, the above results partially confirm hypothesis H4. A schematic diagram of the

significant relationships and effects can be found in Figures 3 and 4. A complete list of results

obtained through the mediation analyses are listed in Table S1 in Supplement A.
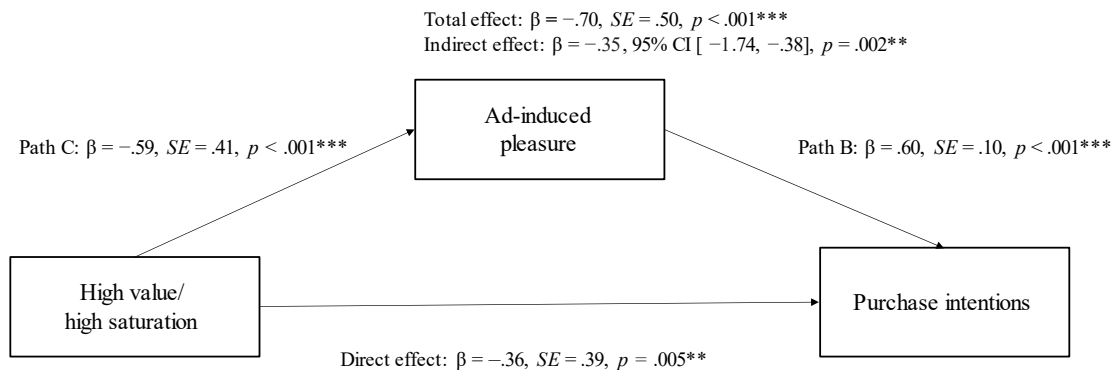
Figure 3

Schematic Diagram of the Partial Mediation of Ad-Induced Pleasure in the Relationship

Between High Value and Purchase Intentions

Total effect: β = .63, *SE* = .37, *p* < .001***
Indirect effect: β = .20, 95%, CI [.04,   1.01], *p* = .033*

Path A: β = .33, *SE* = .30, *p* = .027*

Ad-induced pleasure

Path B: β = .60, *SE* = .10, *p* < .001***

High value

Purchase intentions

Direct effect: β = .42, *SE* = .27, *p* < .001***

Note. * *p* < .05, ** *p* < .01, *** *p* < .001.

Figure 4

Schematic Diagram of The Partial Mediation of Ad-Induced Pleasure in The Relationship

Between HVHS and Purchase Intentions

Total effect: β = −.70, *SE* = .50, *p* < .001***
Indirect effect: β = −.35, 95% CI [−1.74, −.38], *p* = .002**

Ad-induced
pleasure

Path C: β = −.59, *SE* = .41, *p* < .001***

Path B: β = .60, *SE* = .10, *p* < .001***

High value/
high saturation

Purchase intentions

Direct effect: β = −.36, *SE* = .39, *p* = .005**

Note. * *p* < .05, ** *p* < .01, *** *p* < .001.

Discussion

This study examined the influence of different combinations of the value and saturation of the color red in Instagram advertisements on emotional responses and purchase intentions. In line with hypotheses H1a and H2a, changes in value and saturation had significant effects on both ad-induced arousal and pleasure. A specific pattern of findings emerged where high saturation was linked to higher levels of ad-induced arousal, which echoes previous findings by Valdez & Mehrabian (1994) and Suk & Irtel (2009). However, this was only the case when paired with a low value. At odds with hypothesis H2a, there was no significant relationship between high value and arousal. Possible explanations for this finding may be found in the proposed U-shaped relationship between color value and arousal (Suk & Irtel, 2009; Valdez & Mehrabian, 1994), where the threshold of value to reverse the relationship hadn't been reached in this study. Moreover, psychophysiological research claims that higher value colors evoke feelings of relaxation, which negatively correlates with arousal (Gorn et al., 1997; Labrecque &

Milne, 2011). Future research could manipulate the ranges of value more to determine if there is a tipping point at which the link between value and arousal shifts in nature.

An opposite, yet similar, pattern of results is found for the effect of value and saturation on levels of ad-induced pleasure. Specifically, exposure to high value leads to higher levels of pleasure, but only in combination with low saturation. Interestingly, feelings of pleasure decrease when high value is combined with high saturation, which contrasts the earlier finding by Camgöz (2002) who stated that maximum value and saturation levels are likely to be preferred over other combinations. This finding could be explained by Kaltcheva & Weitz (2006), who suggest that higher saturated colors can lower levels of pleasure for task-oriented shoppers.

Current findings show some support for the proposed brightness bias by Lakens and colleagues (2013) but indicate a complex relationship of the combination between value and saturation on emotional responses. Future research should include more combinations of all three color dimensions with different wavelengths that can have different effects on arousal and pleasure (Lee & Andrade, 2010; Valdez & Mehrabian, 1994). Moreover, it would be interesting to study what mechanisms (e.g., color-meaning association, less cognitive direct mechanisms) are associated with the emotional effects of color (Wilms & Oberfeld, 2017).

Both high value and saturation have a significant positive effect on consumers' purchase intentions, but only when paired with their lower counterpart (i.e., low value and saturation). Opposingly, when combined, high value and saturation lead to significantly weaker purchase intentions, just like lower feelings of ad-induced pleasure. These findings underline the importance of the combination of value and saturation, affirming earlier statements by Suk & Irtel (2009) in an Instagram advertisement context. Results of the mediation analysis showed that pleasure partially mediates the relationship between high value and high saturation on purchase

intentions. These findings can be explained by drawing upon the S-O-R framework by Mehrabian and Russell (1974), as the combination of high value and saturation stimuli leads to lower emotional responses in the organism (i.e., consumer), thus resulting in weaker purchase intentions. The relationship between high value and purchase intentions was also partially mediated by pleasure, but this was not the case for high saturation. However, the p values were marginally significant, which could be ascribed to the study being slightly under-powered. Due to these existing concerns on power and sample size, this study included the 8 participants, only 10% of the total participants, who failed the manipulation check. Future research should include a larger sample size to increase power and lower the possibilities of type I and II errors (Christley, 2010).

Interestingly, ad-induced arousal had no significant effect on purchase intentions, whereas ad-induced pleasure did have a positive influence. This finding contradicts research that includes arousal as a PAD descriptor and finds a positive effect on purchase intentions (Chang et al., 2014; Ha & Lennon, 2010). A possible explanation could be the unreliability of the items used to measure arousal, which led to the exclusion of one of the items. Additional studies should include different scales for arousal to see if this effect remains the same. The only covariate that significantly explained variation in the relationship between value and saturation on purchase intentions was color suitability. This corresponds to the finding by Kim & Sung (2013) suggesting the suitability of a color in an advertisement may influence consumers emotion and persuasion.

Limitations

The present study is not without limitations. Firstly, only Instagram advertisements served as stimulus materials, which prevents generalization across different social media

platforms. Future research should include content or ads from other or multiple social network sites, as the functionalities of these platforms can lead to differences in marketing strategies and consumer responses (Teo et al., 2019). Additionally, with the rapid increase in popularity of short video platform (i.e., TikTok) advertising (Chen et al., 2022), future studies should manipulate colors in dynamic advertisements, as opposed to still images, in order to further test the current findings (Zhou et al., 2023).

Secondly, in order to enhance the external validity of the results described within this thesis, actual social media advertisements could be used to better understand real-world marketing dynamics (Rogers & Soopramanien, 2009). On average, participants assigned low scores to the overall product attractiveness ($M = 2.84$, $SD = 0.69$ out of a maximum of 4.60 points) and the match between products and color schemes ($M = 21.90$, $SD = 26.90$ out of a maximum of 100 points). These numbers were also corroborated in the comment section of the survey where two participants mentioned that the red color in the high value/high saturation condition "is really awful" and the color of low value/low saturation was "hard to look at for long periods". Moreover, one participant mentioned that there was "so much of the same advertising". As a result, future research should incorporate more diverse products and pair them with different combinations of the value and saturation of a hue.

Lastly, the present study utilized images of low-involvement products to cater to a wide range of potential participants. Moving forward, it would be interesting to see if the obtained patterns of results would change when targeting high-involvement products or specific types of shoppers, to see if the results of this study align with the earlier mentioned findings of Kaltcheva & Weitz (2006).

Implications

All in all, this study shows that value and saturation of the hue red are linked to consumers' emotional response and purchase intentions. From a practical standpoint, this means that marketers should carefully consider which combination of value and saturation they incorporate into their Instagram advertisement to shape consumer responses. In general, the combination of high value with high saturation of the hue red should be avoided, as it appears to lower ad-related pleasure and weaken purchase intentions. Because ad-induced pleasure mediates the link between manipulations of red hues and purchase intentions, marketers interested in boosting sales should instead opt for a version of red that amplifies pleasure.

From a scholarly standpoint, earlier studies have shown that colors are associated with emotional responses and purchase intentions (Labrecque & Milne, 2011; Valdez & Mehrabian, 1994). Because scholars have tended to focus only on high value and high saturation, the present study examined how alternate combinations of value and saturation can impact emotional responses and purchase intentions. Results indicate that different combinations of value and saturation either induce significantly higher or lower levels of arousal, pleasure and purchase intentions, showing support for Labrecque (2020) who stressed the relevance of incorporating value and saturation in color-based research. Possible explanations were provided to account for the findings of the experiment. The present research should encourage academic researchers to adopt the S-O-R framework when examining the effects of color (i.e., hue, value, and saturation) on consumer emotions and behavioral responses.

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Supplement A: Additional Results and Analyses

Table S1

Mediation Model Predicting Mediation Effect of Ad-Induced Arousal and Pleasure Between Relationship Value, Saturation and

Purchase Intentions

Type	Effect	β *(SE)*	LL 95% *CI*	UL 95% *CI*	*z*	*p*
Indirect	High saturation → Ad-induced arousal → Purchase intentions	.02 (.06)	−.06	.19	1.03	.301
	High saturation → Ad-induced pleasure → Purchase intentions	.16 (.23)	−.03	.86	1.83	.067
	High value → Ad-induced arousal → Purchase intentions	.01 (.04)	−.05	.12	.73	.466
	High value → Ad-induced pleasure → Purchase intentions	.20 (.25)	.04	1.01	2.14	.033*
	High value/high saturation → Ad-induced arousal → Purchase intentions	.01 (.06)	−.07	.16	.73	.468
	High value/high saturation → Ad-induced pleasure → Purchase intentions	−.35 (.35)	−1.74	−.38	−3.06	.002**
Component	High saturation → Ad-induced arousal	.27 (.27)	.03	1.10	2.05	.040*
	Ad-induced arousal → Purchase intentions	.09 (.10)	−.08	.31	1.20	.232
	High saturation → Ad-induced pleasure	.26 (.28)	−.02	1.09	1.88	.060
	Ad-induced pleasure → Purchase intentions	.60 (.10)	.59	.97	8.16	< .001 ***
	High value → Ad-induced arousal	.13 (.29)	−.30	.84	.92	.359

Type	Effect	β (SE)	LL 95% CI	UL 95% CI	z	p
	High value → Ad-induced pleasure	.33 (.30)	.08	1.27	2.22	.027*
	High value/high saturation → Ad-induced arousal	.15 (.40)	−.41	1.14	.91	.362
	High value/high saturation → Ad-induced pleasure	−.59 (.41)	−2.16	−.55	−3.30	< .001 ***
Direct	High saturation → Purchase intentions	.46 (.26)	.73	1.74	4.79	< .001 ***
	High value → Purchase intentions	.42 (.27)	.58	1.65	4.07	< .001 ***
	High value/high saturation → Purchase intentions	−.36 (.39)	−1.86	−.34	−2.83	.005**
Total	High saturation → Purchase intentions	.64 (.34)	1.05	2.39	5.03	< .001 ***
	High value → Purchase intentions	.63 (.37)	.96	2.39	4.58	< .001 ***
	High value/high saturation → Purchase intentions	−.70 (.50)	−3.09	−1.15	−4.27	< .001 ***

Appendix A: Final Stimuli Material

Product Line Images

Grayscale

Low value- low saturation condition

Low value - high saturation condition
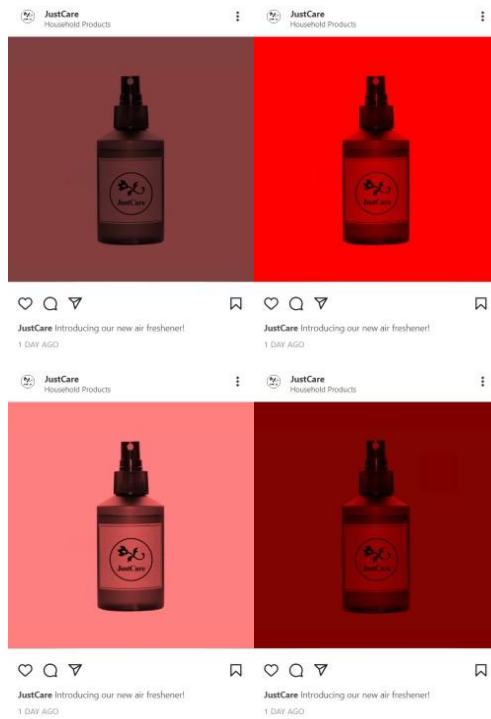

High value - low saturation condition
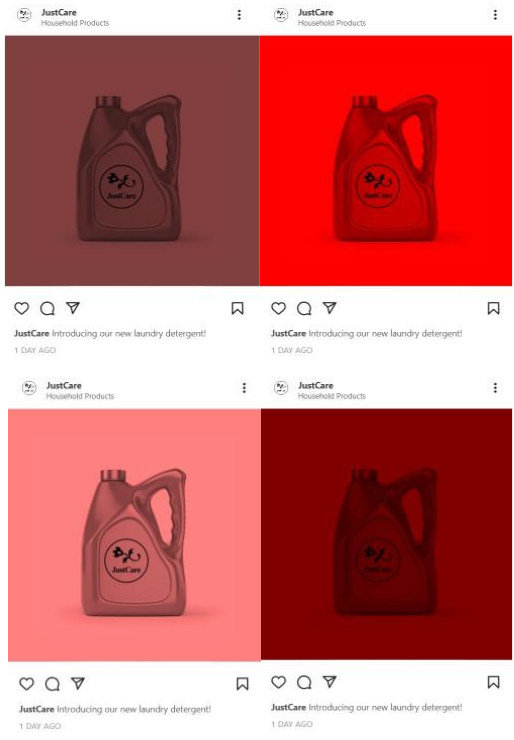
High value - high saturation condition
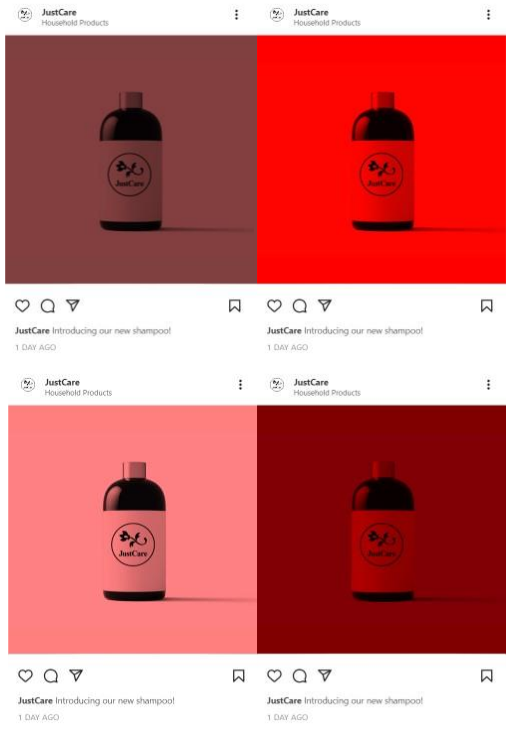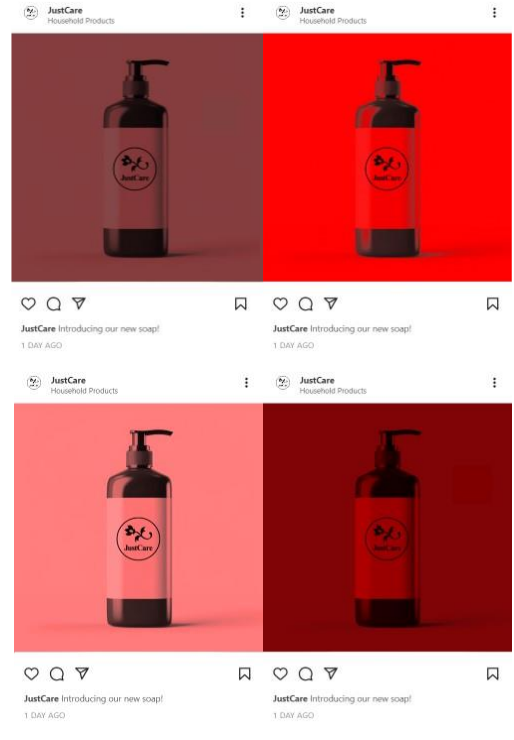

Instagram Advertisement Images:

Air freshener
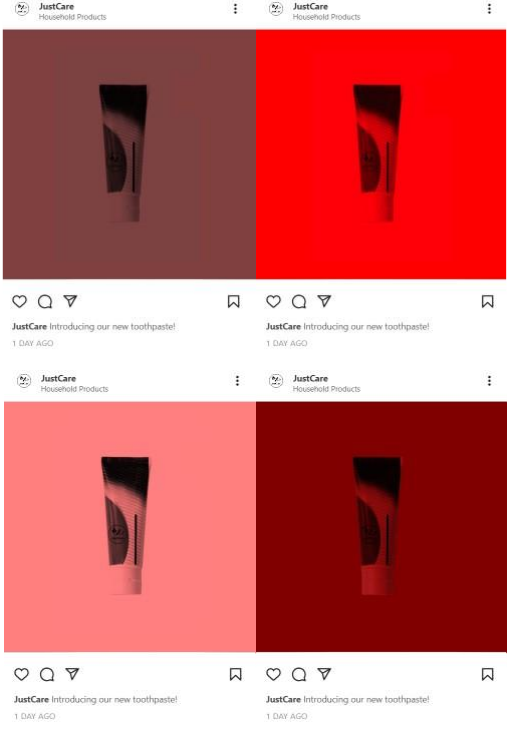
Laundry detergent

Shampoo

Soap

Toothpaste

Supplement B: Questionnaire Transcript Low Value - Low Saturation Condition

Consent Form

You have been invited to participate in a research that is conducted as part of a master's program at Tilburg University. The following form will provide you with information about the study and survey. This study is conducted by Raf Schuman, Master student in Business Communication and Digital Media track of the MSc Communication and Information Sciences at Tilburg University.

The purpose:

The goal of this research is to study the emotions and behavior of people after seeing different kinds of Instagram advertisements.

What is asked from you:

You will be asked several questions about yourself, your emotions and your online shopping behavior. Please note that there are several criteria that need to be met in order to participate in this study. The desired participant is aged between 18 through 34 years, has no-color based visual impairments, uses Instagram and is proficient enough in the English language to understand the questioning. If you do not meet all the criteria above, you will be directed to the end of the survey. The survey will take approximately 7 minutes to complete.

Risks:

There are no foreseen risks related to participating in this study.

Compensation & Benefits:

There is no compensation for participation. There are no direct benefits related to this study besides learning more about how you feel after seeing Instagram advertisements. Indirect benefits are contributing to scientific knowledge and helping the researcher graduate.

Voluntarily:

The participation in this study is enterally voluntary and you have the option to stop at any time without any consequences. If there are any questions you don't want to answer, feel free to skip them.

Privacy:

You will remain completely anonymous and all data will be handled confidentially for this research only.

Questions:

If you have any questions or remarks about this research, you can contact the researcher at: r.a.g.a.schuman@tilburguniversity.edu.

Thank you in advance for your time and cooperation.

Raf Schuman

Questionnaire

Please note that this question is specific to your ability to see colors. Wearing glasses or contacts for corrected vision are not relevant here.

Do you suffer from color blindness or other color-based visual impairments?

o Yes

o No

Would you describe yourself as proficient in the English language?

o Yes

o No

Do you use Instagram?

o Yes

o No

How much time do you spend on Instagram daily?

o 10 minutes or less

o 11-30 minutes

o 31-60 minutes

o 1-2 hours

o 2-3 hours

o 3 hours or more

Think about your current emotional state.

At this moment I feel:

	1	2	3	4	5	6	7	
Relaxed	o	o	o	o	o	o	o	Stimulated
Unaroused	o	o	o	o	o	o	o	Aroused
Frenzied	o	o	o	o	o	o	o	Sluggish

Calm	o	o	o	o	o	o	o	Excited
Sleepy	o	o	o	o	o	o	o	Wide awake

At this moment I feel:

	1	2	3	4	5	6	7	
Unhappy	o	o	o	o	o	o	o	Happy
Annoyed	o	o	o	o	o	o	o	Pleased
Not contented	o	o	o	o	o	o	o	Contented
Despairing	o	o	o	o	o	o	o	Hopeful

Think about the emotions you experience or want to experience when seeing advertisements.

After seeing an advertisement, how much would you like to feel the following emotions?

	1	2	3	4	5	6	7	
Relaxed	o	o	o	o	o	o	o	Stimulated
Unaroused	o	o	o	o	o	o	o	Aroused
Frenzied	o	o	o	o	o	o	o	Sluggish
Calm	o	o	o	o	o	o	o	Excited
Sleepy	o	o	o	o	o	o	o	Wide awake

After seeing an advertisement, how much would you like to feel the following emotions?

	1	2	3	4	5	6	7	
Unhappy	o	o	o	o	o	o	o	Happy

Annoyed	○	○	○	○	○	○	○	Pleased
Not contented	○	○	○	○	○	○	○	Contented
Despairing	○	○	○	○	○	○	○	Hopeful

For the next part of this survey, you will be shown several products from the household product brand JustCare. Above each image there is a short description of what you see. I would like to ask you to carefully look at the product and the colors in the image.

Please look at the following Instagram advertisement of a SOAP from the brand JustCare. I would like you to now imagine that you are reviewing this advertisement.

After seeing this advertisement, I felt:

	1	2	3	4	5	6	7	
Relaxed	o	o	o	o	o	o	o	Stimulated
Unaroused	o	o	o	o	o	o	o	Aroused
Frenzied	o	o	o	o	o	o	o	Sluggish
Calm	o	o	o	o	o	o	o	Excited
Sleepy	o	o	o	o	o	o	o	Wide awake

After seeing this advertisement, I felt:

	1	2	3	4	5	6	7	
Unhappy	○	○	○	○	○	○	○	Happy
Annoyed	○	○	○	○	○	○	○	Pleased
Not contented	○	○	○	○	○	○	○	Contented
Despairing	○	○	○	○	○	○	○	Hopeful

After seeing this advertisement:

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

	o	o	o	o	o	o	o
I would purchase this product							
I'm considering purchasing this product	o	o	o	o	o	o	o
I wouldn't purchase this product	o	o	o	o	o	o	o

Please look at the product line below

How well did the color match the products?

Not at all   Very much

0 10 20 30 40 50 60 70 80 90 100

The color matched	

THIS PROCESS IS IDENTICALLY REPEATED FOR ALL FIVE PRODUCTS ACROSS ALL FOUR CONDITIONS

What was the dominant color of the Instagram advertisement images that you evaluated?

o Image: LVLS square

o Image: HVHS square

o Image: HVLS square

o Image: LVHS square

o I did not see any color in the Instagram advertisements images

o I could not see the Instagram advertisement images

Please look at the product line below. Note that now, there are NO color adjustments. I would like you to now imagine that you are reviewing each of these products as they are.

Thinking about these products from JustCare, as they are shown now, which of the following statements best describes your feeling about the products?

	I dislike it very much	I dislike it	I neither like it nor dislike it	I like it	I like it very much
Air freshener	O	O	O	O	O

Laundry detergent	○	○	○	○	○
Shampoo	○	○	○	○	○
Soap	○	○	○	○	○
Toothpaste	○	○	○	○	○

Is there anything you want to say with regards to this research?

_____

Thank you for your time and cooperation! If you would like to help this research gain more participants, you could send out the following link to your own network:

https://tilburghumanities.eu.qualtrics.com/jfe/form/SV_bJim8IAuAzhR4do

If there are any questions or remarks about the survey please don't hesitate to reach out to the researcher at: r.a.g.a.schuman@tilburguniversity.edu.

Survey Circle

Exchange this Survey Code with one click: https://www.surveycircle.com/MB22-1Z2X-598G-5JLL/