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THE INFLUENCE OF COLOR ON CAPTURING CUSTOMER ATTENTION IN ONLINE PURCHASES OF ORGANIC COSMETICS CASE

Sanja Cvetojević, Sandra Dedijer
University of Novi Sad, Faculty of Technical Sciences,
Department of Graphic Engineering and Design, Novi Sad, Serbia

Abstract: *This study examines the effect of colour on users in the context of online sales of organic cosmetics. The primary goal is to identify which colours most effectively capture attention and drive engagement, ultimately influencing purchasing behaviours for organic cosmetic products. Through the use of eye-tracking technology, participants' attention and focus were monitored as they observed products displayed in various colours on screens. Key metrics such as Time to First View and Time Viewed were analyzed to gain a comprehensive understanding of how participants' attention and engagement were impacted by the recommended colour tones, particularly concerning their perception of organic cosmetics. The analysis revealed that lighter tones are detected more rapidly than darker tones, with statistical analysis supporting the finding that lighter colours more effectively attract immediate attention. Additionally, stimuli in lighter tones were viewed for longer periods compared to those in darker tones. This study provides a preliminary exploration of how colour tones influence the attention and engagement of e-commerce users. The findings offer valuable insights into the emotional and cognitive dimensions of consumer engagement, enhancing our understanding of how colour affects purchasing behaviour.*

Key words: Impact of colour, online sales, organic cosmetics

1. INTRODUCTION

Humans are inherently visual beings, perceiving the world through colours and shapes, a process deeply embedded in human nature. Light, as it enters the eyes and reaches the brain, is converted into visual signals that facilitate rapid and intuitive decision-making. In this intricate process, colours play a pivotal role in our interpretation of the surrounding world. As a core element of visual design, colour possesses the power to evoke strong associations and significantly influence both our emotional and cognitive responses. It has the capacity to inspire, calm, or provoke action. The ability of colour to communicate with our inner world and trigger a range of emotional reactions forms a complex network of associations and meanings, thus playing a crucial role in shaping our experiences and perceptions (Demirbilek & Sener, 2003). This communication is further enriched by diverse cultural and social contexts, where the associations and meanings of colours vary globally, influenced by historical, social, and cultural factors. For example, perceptions of colour differ between men and women (Ellis & Ficek, 2001). These differences are also evident across various age groups, with adults and children reacting differently to specific colours (Casas & Chinoperekweyi, 2019). These variations underscore the complexity of colour use in design, while also highlighting its potential to create powerful visual and emotional experiences that are tailored to users and their distinct experiences.

Packaging design, a fundamental aspect of branding, significantly impacts the purchasing process, especially in situations constrained by time. An effective packaging design must be informative, functional, and aesthetically appealing, with colour serving a pivotal role in capturing attention and shaping consumer emotions and decision-making (Reimann et al., 2010). This interplay can be critical in forming a strong initial impression and ultimately influencing the final purchase decision.

In the context of organic cosmetic product packaging, colour is employed not merely to draw attention but also to communicate the product's inherent values and attributes. The choice of colours is meticulously crafted to reflect the product's naturalness, purity, and ecological consciousness. For instance, green and brown hues are commonly associated with natural and organically sourced ingredients, while beige and cream tones evoke a sense of simplicity and sophistication. Colours used in organic product packaging help consumers identify items that align with their ecological values, thereby enhancing the product's visual identity and reinforcing its positioning as a sustainable choice (Mohebbi, 2014).

Packaging colour holds significant importance in the domain of digital promotion, particularly within the context of online stores and their catalogues, which function as primary channels of communication between consumers and products. In an environment where purchasing decisions are increasingly driven by visual impressions, the strategic selection of packaging colour can be instrumental in capturing attention

and distinguishing a product amidst a sea of alternatives. Since online catalogues often serve as the first point of contact with a product, careful selection of packaging colour is crucial for attracting potential customers. In these reduced-scale product displays, colour stands out as one of the most influential visual elements capable of captivating users' interest and encouraging further exploration (Purwati, 2011). The organization of products within catalogues, combined with thoughtful use of brand-reflective colours, not only enhances the product's visual identity but also increases its likelihood of being noticed and remembered. This approach helps products stand out on crowded digital shelves, capturing consumer attention—a crucial factor for success in a competitive market.

Considering the importance of understanding how participants visually respond to and associate packaging colours with organic cosmetics, particularly in the context of online shopping, this experiment utilized eye-tracker technology for its ability to provide precise insights into real-time visual processes. The key metrics analyzed were Time to First View—indicating how quickly a colour (stimuli) is noticed—and Time Viewed, which measures the duration of attention given to specific stimuli. These metrics reveal where participants focus their attention, how long they engage with particular visual elements, and which colours capture their notice first.

2. METHODS

The study was organized into three main phases, details are described below.

Based on the market research conducted (review of websites of organic cosmetics manufacturers and sellers, around 50, i.e. Herbalia (https://herbalia.rs/)), to assess the recognition of organic cosmetics within a wide product range, colours typically recommended for organic cosmetic products were chosen as reference stimuli (Figure 1), alongside the identification of colours generally endorsed for the cosmetics industry (Figure 2). CieLab and HSB values for the reference stimuli are shown in Table 1, and those for the non-reference stimuli are in Table 2. The minimalistic packaging stimuli, with colour-based design, were created in the next phase, for newly designed organic cosmetic brand named "Avelis" and a hand cream was chosen as the representative product.

Figure 1: Representation of reference stimuli (S1, S2, S3, S4, S5)

*Table 1: Representation of the CIE L*a*b* and HSB coordinate values of the reference stimuli*

stimuli	CIE L*a*b*	HSB
S1	(48.78, 10.95, 21.57)	(26.00°, 45.00%, 57.00%)
S2	(68.34, 10.48, 33.69)	(32.00°, 48.00%, 80.00%)
S3	(86.14, -0.27, 32.39)	(43.00°, 35.00%, 93.00%)
S4	(59.16, 23.54, 54.38)	(31.00°, 79.00%, 79.00%)
S5	(36.20, -16.79, 17.72)	(101.00°, 39.00%, 36.00%)

Figure 2: Representation of non-reference stimuli (S6, S7, S8, …, S19)

The second phase involved creating five reference stimuli and fourteen non-reference stimuli using the previously mentioned recommended colours associated with both organic and general cosmetic products. These stimuli were organized into five groups, each containing a total of fifteen stimuli, with one reference stimuli per group (an example of one stimuli group is shown in Figure 3).

*Table 2: Representation of the CIE L*a*b* and HSB coordinate values of the non-reference stimuli*

Stimuli	CIE L*a*b*	HSB
S6	(81.17, -23.79, 73.22)	(65.14°, 78.42%, 82.84%)
S7	(79.22, 9.47, 78.68)	(43.85°, 90.80, 96.94%)
S8	(44.64, 52.89, 41.57)	(7.12°, 79.90, 75.37%)
S9	(31.84, 48.64, 27.99)	(356.19°, 81.99%, 57.4%)
S10	(72.18, 29.81, 7.59)	(353.67°, 33.03%, 91.49%)
S11	(50.42, 61.39, -17.93)	(322.14°, 66.96%, 79.14%)
S12	(44.98, 21.32, -20.64)	(279.84°, 32.55%, 55.29%)
S13	(29.1, 22.16, -23.68)	(273.54°, 45.66%, 41.34%)
S14	(26.29, 42.37, -14.49)	(318.69°, 75.48%, 43.61%)
S15	(82.48, -13.71, -5.86)	(183.01°, 21.39%, 84.57%)
S16	(70.21, -41.37, 16.65)	(150.12°, 53.18%, 74.69%)
S17	(70.81, -34.26, -12.26)	(181.46°, 72.83%, 76.24%)
S18	(47.22, 5.22, -42.86)	(213.56°, 68.89%, 72.2%)
S19	(25.53, 7.12, -27.47)	(222.24°, 59.68%, 40.05%)

Figure 3: Representation of a group of stimuli

The third phase focused on preparing the stimuli and equipment for the experiment. Initially, each participant was positioned at a specified distance of 65 cm from the EIZO ColorEdge CG241W monitor to allow the Gazepoint GP3 eye-tracker device (positioned in front of the monitor) to detect their eye movements during content observation. The setup of the monitor, eye-tracker, and participant positions is illustrated in Figure 4. Each group of stimuli was displayed for ten seconds, during which gaze tracking recorded the Time to First View and Time Viewed for each participant.
The analysis of data collected from the study were focusing on key metrics obtained through eye-tracking technology. The statistical methods employed included a one-way between-groups analysis of variance.

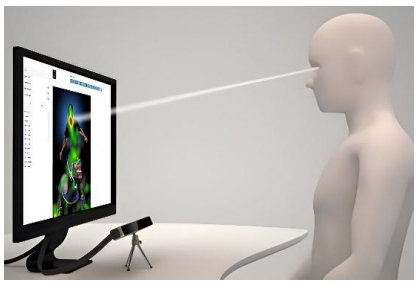

Figure 4: Participant's position relative to the monitor and eye tracker setup

3. RESULTS AND DISCUSSION

3.1. Demographic Profile of Respondents

Within the demographic profile of respondents, there were 180 participants in total, comprising 130 (72%) women and 50 (28%) men (Figure 5).

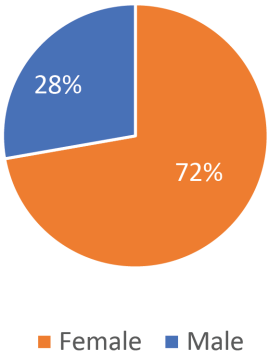

Figure 5: Graphical representation of gender distribution

The largest proportion of respondents, 97%, regardless of gender, falls within the age of 20- 24 years, (Figure 6).

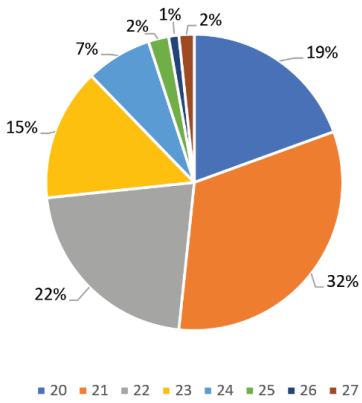

Figure 6: Graphical representation of age distribution

3.2. Analysis of Participant Interaction Metrics

The key metrics analyzed were Time to First View, which measures how quickly a stimuli is noticed, and Time Viewed, indicating the duration of attention given to specific stimuli. According to the Time to First View results, stimuli 3 was detected the fastest among all reference stimuli, followed by stimuli 2 and stimuli 5 (Figure 7). Stimuli 4 performed better than stimuli 1 in terms of detection speed (Figure 7). Regarding Time Viewed, stimuli 2 and 3 held participants' attention for the longest durations, with stimuli 1 following closely (Figure 8). In contrast, stimuli 4 and 5 had the shortest observation times (Figure 8). The analysis of these metrics provides valuable insights into participants' focal points of attention, the duration of their engagement with specific visual elements, and which colours initially captured their notice. These observations reveal a complex relationship between Time to First View and Time Viewed. For example, although stimuli 3 attracted attention the fastest, it did not retain the observer's attention as long as stimuli 2, which took more time to be noticed but held attention for a longer period. Additionally, stimuli 1 and 4 were detected around the midpoint of the total display time (10 seconds) and, although they required slightly more time to be noticed compared to stimuli 5, they exhibited longer viewing durations than stimuli 5.

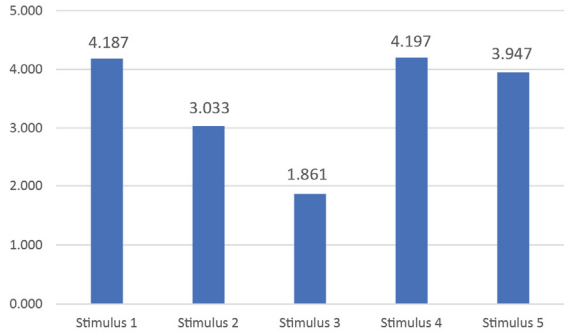

Figure 7: Graphical representation of Time to First View (sec)

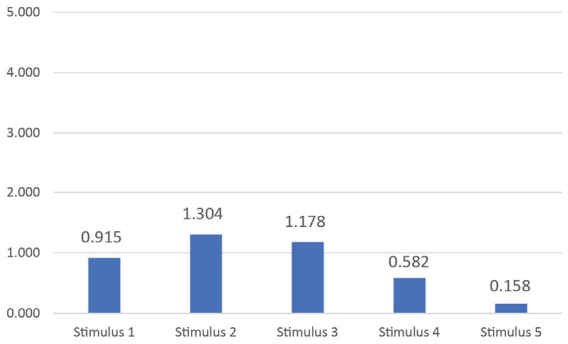

Figure 8: Graphical representation of Time Viewed (sec)

Accordingly, in the correlation graph (Figure 9), it can be observed that the value of the correlation coefficient, indicates a moderate correlation between the time required to detect the stimuli and the time spent observing it. This suggests that while certain stimuli may capture attention quickly, this does not necessarily lead to longer viewing durations. Various factors appear to influence both recognition and engagement levels, highlighting the complexity of the relationship between how quickly a stimuli is noticed and how long it retains attention.

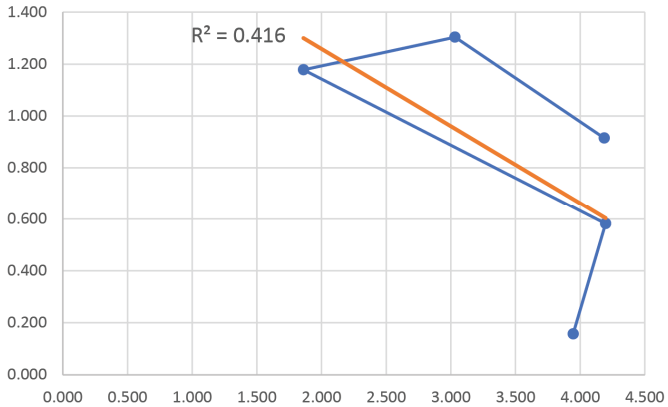

Figure 9: Correlation graph between Time to First View and Time Viewed

Table 3 presents the Time to First View values for non-reference stimuli, organized into two groups based on whether they were noticed before or after the reference stimuli. The results show that the recognition of reference stimuli among the non-reference stimuli largely aligns with the order established among the reference stimuli (Figure 7). Specifically, the reference stimuli with the shortest Time to First View in Figure 7 also exhibited the shortest Time to First View among all non-reference stimuli (Table 3).

Table 3: Comparison of reference and non-reference stimuli based on Time to First View

Reference stimuli	Non-reference stimuli with shorter Time to First View	Non-reference stimuli with longer Time to First View
S1	All Remaining (8/14)	S19 ,17 ,7 ,13 ,6 ,9
S2	S16 ,18	All Remaining (12/14)
S3	-	All (14/14)
S4	All Remaining (8/14)	S11 ,7 ,14 ,8 ,18 ,13
S5	S7 ,16 ,6 ,9 ,17	All Remaining (9/14)

Table 4 presents the Time Viewed values for non-reference stimuli, also organized into two groups, indicating whether they were observed for a shorter or longer duration compared to the reference stimuli. With the exception of stimuli S4, all other reference stimuli had the longest Time Viewed compared to the non-reference stimuli. This suggests that the reference stimuli generally held attention for a longer period than the non-reference ones.

Table 4: Comparison of reference and non-reference stimuli based on Time Viewed

Reference stimuli	Non-reference stimuli with shorter Time Viewed	Non-reference stimuli with longer Time Viewed
S1	All (14/14)	-
S2	All (14/14)	-
S3	All (14/14)	-
S4	All Remaining (11/14)	S6 ,15 ,16
S5	All (14/14)	-

Figures 10 and 11 present two heatmap visualizations for randomly chosen two participants, further supporting the previous observations. These visualizations demonstrate that, although stimuli S5 (Figure 11) had the shortest viewing time among the reference stimuli, it was still significantly recognized within the non-reference group. In contrast, this pattern is not observed with stimuli S4 (Figure 10), where greater attention was directed toward non-reference stimuli S6, S15, and S16.
This highlights the varying degrees of recognition and attention across different stimuli, reinforcing the complexity of how both reference and non-reference stimuli capture attention.

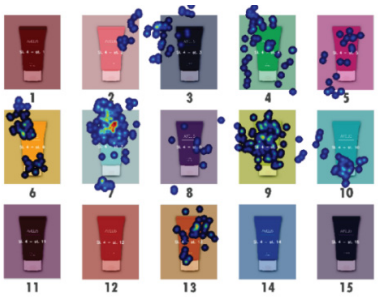

Figure 10: Heatmap of participant 63 with reference stimuli S4 (position 13)

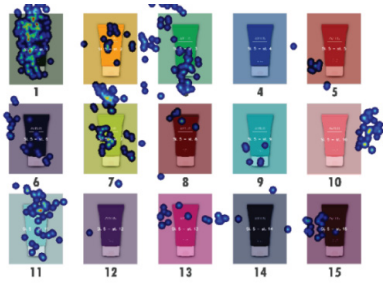

Figure 11: Heatmap of participant 32 with reference stimuli S5 (position 1)

3.3. Statistical Analysis of Participant Interaction Metrics

A one-way between-groups analysis of variance (one-way ANOVA) was performed to examine the impact of different stimuli on the parameter Time to First View. The results presented in Table 5 reveal a statistically significant difference in the parameter Time to First View among the stimuli (S1, S2, S3, S4, S5): $F(4, 895) = 51.611$, $p < 0.001$. The substantial difference between the mean values of the stimuli is indicated by an eta-squared value of 0.187, reflecting a large effect size.

Table 5: ANOVA results for Time to First View

ANOVA					
Time to first View					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2347.696	4	586.924	51.611	.000
Within Groups	10177.988	895	11.372		
Total	12525.683	899			

Since the Homogeneity of Variances test indicated that homogeneity was not confirmed, the Dunnett T3 Post Hoc test was conducted. As shown in Table 6, a statistically significant difference in Time to First View was found in all comparisons except between stimuli S1 and S4, where no significant difference was observed.

Table 6: Dunnett T3 results for Time to First View

Multiple Comparisons							
Dependent Variable: Time to first View							
	(I) S	(J) S	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Dunnett T3	S1	S2	1.5744556*	.3392655	.000	.619022	2.529889
		S3	2.7947167*	.3346474	.000	1.852287	3.737146
		S4	-.5331333	.3515682	.749	-1.523247	.456981
		S5	-1.8131667*	.3692477	.000	-2.853198	-.773135
	S2	S3	1.2202611*	.3361461	.003	.273609	2.166913
		S4	-2.1075889*	.3529951	.000	-3.101714	-1.113464
		S5	-3.3876222*	.3706065	.000	-4.431464	-2.343780
	S3	S4	-3.3278500*	.3485589	.000	-4.309507	-2.346193
		S5	-4.6078833*	.3663836	.000	-5.639886	-3.575881
	S4	S5	-1.2800333*	.3819009	.009	-2.355583	-.204483

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

A one-way between-groups analysis of variance (one-way ANOVA) was conducted also to assess the impact of different stimuli on the parameter Time Viewed. The results, as shown in Table 7, reveal a statistically significant difference in viewing time among the stimuli (S1, S2, S3, S4, S5): $F(4, 895) = 23.152$, $p < 0.001$. Despite this significant difference, the eta-squared value of 0.093 indicates a medium effect size.

Table 7: ANOVA results for Time Viewed

ANOVA					
Time Viewed					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	155.754	4	38.938	23.152	.000
Within Groups	1505.238	895	1.682		
Total	1660.992	899			

Similar to the case with the Time to First View parameter, homogeneity was not confirmed, which is why the Dunnett T3 Post Hoc test was conducted. Additionally, Table 8 shows that significant differences were found in all pairwise comparisons except between S1 and stimuli S2, S3 and S4 as well as between stimuli S2 and S3, where no significant differences were detected. This suggests variability in how different tones

are perceived in terms of viewing time. That may indicate that the viewing time is firstly influenced by the lightness of the stimuli, rather than the tone of the stimuli since S2 and S3 are lighter stimuli in comparison to S4 and S5.

Table 8: Dunnett T3 results for Time Viewed

Multiple Comparisons							
Dependent Variable: Time Viewed							
	(I) S	(J) S	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Dunnett T3	S1	S2	-.3885278	.1613813	.153	-.843174	.066118
		S3	-.2624444	.1542207	.606	-.696839	.171950
		S4	.3328111	.1265134	.085	-.023576	.689198
		S5	.7571278*	.1009329	.000	.471466	1.042789
	S2	S3	.1260833	.1740467	.998	-.364080	.616246
		S4	.7213389*	.1500463	.000	.298286	1.144392
		S5	1.1456556*	.1292118	.000	.779829	1.511482
	S3	S4	.5952556*	.1423165	.000	.194118	.996393
		S5	1.0195722*	.1201491	.000	.679434	1.359710
	S4	S5	.4243167*	.0815930	.000	.193498	.655136

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

4. CONCLUSION AND FURTHER RESEARCH

This study focused on understanding how colour tones used in organic cosmetics packaging influence participants' attention and engagement, particularly in the context of online shopping, by analyzing two key metrics—Time to First View and Time Viewed.

The results demonstrate that lighter tones, such as light yellow and light brown, are detected more swiftly than darker tones, including dark brown, dark orange, and dark green. Statistical analysis supports these findings, revealing significant differences between lighter and darker tones in terms of detection speed. Additionally, lighter-toned stimuli (stimuli 2 and 3) were observed for longer periods than darker-toned stimuli (stimuli 1, 4, and 5).

The study also highlighted that the time required to detect a stimuli (Time to First View) does not necessarily correspond to the duration of time spent viewing that stimuli (Time Viewed). While there is a moderate correlation between these two metrics, it is not strong enough to suggest a significant relationship, indicating that various factors influence viewer engagement.

This is further confirmed by instances where stimuli that attracted attention more quickly did not always result in longer viewing times. This research offers an initial exploration of how colour tones affect attention and engagement in e-commerce users. To validate these findings more conclusively, future research should include a broader range of tones and brightness levels. Such an expanded study would provide deeper insights and enhance the understanding of how different colour tones and brightness levels impact consumer perceptions and behaviour, particularly when viewing organic cosmetic packaging on e-commerce platforms.

5. ACKNOWLEDGMENTS

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