Exploring the Impact of Packaging Colour Harmony on Fast Moving Consumer Goods in Sri Lanka

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Abstract

This study investigates the impact of packaging colour harmony on purchasing intentions in Sri Lanka's Fast-Moving Consumer Goods (FMCG) sector. Focusing on bottled water, toothpaste, and detergent powder, the research examines five colour harmonies using 50 colour palettes of Monochromatic, Complementary, Split-Complementary, Analogous colour harmonies and major neutral colours. Using a mixed-methods approach, data was collected from Sri Lankan consumers aged 20-59 through well-constructed surveys administered via Google Forms.

The study addresses a critical gap in existing literature by exploring the relationship between various colour harmonies and consumer preferences across 3 FMCG product categories. Key findings reveal the most preferred colour harmonies for each product category, the influence of product type on colour preferences, and the relationship between colour choices and demographic factors.

The research provides significant implications for marketers, designers, and business owners, particularly small and medium-sized enterprises (SMEs) and entrepreneurs. By understanding how colour combinations in packaging affect consumer behavior and purchase intent, and using the methods used and introduced, and the potential colour palettes identified in this study, businesses may be able to enhance their packaging strategies to increase brand recognition, and drive sales.

This study contributes to the broader field of colour psychology in marketing and branding, offering actionable recommendations for innovative packaging design and brand development using appropriate colour combinations tailored to the Sri Lankan FMCG market. The insights gained can help businesses optimize their packaging designs to gain a competitive edge in the dynamic FMCG landscape, with potential applications in international markets as well.

Introduction

In today's increasingly complex and saturated markets, both consumers and marketers face challenges due to the abundance of competing products and messages.[3] To achieve significant success when designing products for competitive markets, marketers must consider various factors that influence consumer buying behavior, including product quality, brand image, packaging, price, features, and consumer preferences...etc.[7]

Packaging has emerged as a crucial element in purchase decisions at the point of sale, playing a vital role in the selling process.[9] Within packaging design, colour holds particular importance in capturing consumer attention, conveying brand attributes, and influencing purchasing behavior. Colour significantly impacts consumer perceptions and choices by evoking specific emotions and moods, helping products stand out on shelves, aligning with brand identity, and differentiating from competitors.[8]

Previous studies have identified both the positive and negative impacts of using colours in packaging, emphasizing the critical importance of selecting appropriate colours for product packaging. In 2000, Heinz introduced green-coloured tomato ketchup for children, deviating

from its usual packaging. Despite concerns about its appeal, the initiative was a success, boosting profits by $23 million and showcasing the power of unexpected colours in marketing. In 2006, Nestlé replaced blue Smarties with white due to health concerns over chemical dyes. However, the change was unpopular, leading to consumer backlash. In 2008, Nestlé reintroduced blue Smarties using a natural dye, underscoring the importance of colour in consumer preferences. In 2011, Coca-Cola's temporary white can redesign for polar bear conservation caused consumer confusion due to its similarity to Diet Coke's packaging. This failed change highlighted the need for consistent and recognizable colour codes in branding.[6]

While individual colours have been studied in marketing contexts, the effects of colour combinations may differ and warrant further investigation.[4] Colour harmonies provide a framework for creating visually appealing and balanced compositions, offering insights into effective colour combinations. Understanding colour harmonies allows for intentional use of colour to evoke emotions, convey messages, and create impactful designs. This systematic approach to colour selection helps ensure aesthetically pleasing and effective combinations that achieve desired artistic or design goals. [10]

This research focuses on fast-moving consumer goods (FMCGs),[2] specifically bottled water,[1] detergent powder, and toothpaste. Packaging is likely to have a significant influence on purchasing decisions for these low-involvement goods.[9] The study concentrates on product categories where consumers perceive the fundamental products to be relatively consistent across brands.[6]

The aim of this research is to investigate the impact of colour harmonies in packaging design on consumer purchase intentions for toothpaste, detergent, and bottled water in Sri Lanka. The study will examine five distinct colour harmony approaches: Monochromatic, Complementary, Split-Complementary, Analogous, and Neutral Colours. The findings will provide valuable insights for startups and SMEs in Sri Lanka to optimize their packaging designs and boost sales.

Research Questions

- How do different packaging colour harmonies (Analogous, Monochromatic, Split-Complementary, Complementary, and Neutral) influence Sri Lankan consumers' purchase intentions for toothpaste, detergent powder, and bottled water?
- What are the predominant colour harmony strategies employed in packaging designs for toothpaste, detergent powder, and bottled water in the international market and specifically within Sri Lanka?

Proposed Research Objectives

- Examine how different colour harmonies (monochromatic, complementary, split-complementary, analogous, and neutral) influence purchase intent for bottled water, toothpaste, and detergent powder in Sri Lanka.
- To determine if product type affects colour preferences among Sri Lankan consumers.
- Analyze and compare colour harmonies used in current market product packaging.
- Identify opportunities for innovative packaging and brand revitalization in the FMCG industry, focusing on bottled water, toothpaste, and detergent powder products for SMEs and entrepreneurs.

This study will assist marketers in making informed decisions about product packaging, advertising, and market positioning using bottled water, toothpaste, and detergent powder as example products. It will also help SMEs and business owners understand market nuances and opportunities. The findings will provide designers and marketers with insights into Sri Lankan consumer behavior regarding colour combinations

in packaging, which will be valuable for designing product packaging in competitive markets.

In this paper, the research methodology will be outlined. The results of the statistical analysis will then be presented, along with a discussion of the findings and data visualization charts for the exploratory part of the study. Finally, the research will offer managerial implications, acknowledge limitations, and suggest areas for future research.

Methodology

The research study aimed to explore consumer preferences for product packaging based on different colour harmonies. The methodology involved creating 50 samples for each product using major colour combinations across five colour harmonies: Analogous, Monochromatic, Split-Complementary, Complementary, and Neutral. Each harmony had a specific number of samples: 12 for Analogous, Monochromatic, and Split-Complementary, 6 for Complementary, and 8 for Neutral. Participants were asked to choose their top three preferences in a hypothetical shopping scenario where only packaging colour differed among products.

Sample and Population: The study focused on Sri Lankan KCGI students aged 20-59, representing a broader population of 4.1 billion potential consumers worldwide. The sample size was calculated to be 385 for a 5% margin of error and a 95% confidence level, but data was collected from 100 respondents, resulting in a 9.6% margin of error.

Data Collection: A mixed-method approach was used, combining qualitative and quantitative data. Respondents were selected through random sampling and completed a survey via Google Forms.

Survey Design: The survey included a Ishihara colour test initially to test colour blindness. Respondents who answered Colour blind test correctly continue to demographic questions, followed by sections

Where respondents selected their preferred product samples as 1st 2nd and 3rd ranking based on colour harmony and then the reasons for the choices, meanings and associations, colour suggestions were recorded for bottled water, toothpaste, and detergent powder. Each respondent could select one colour sample only once per product.

Hypotheses: The study tested several hypotheses regarding the impact of different packaging colour harmonies on purchase intentions for bottled water, toothpaste & detergent powder products:

- H1: Preferences differ with Analogous Colour Harmony.
- H2:Preferences differ with Monochromatic Colour Harmony.
- H3:Preferences differ with Split-Complementary Colour Harmony.
- H4:Preferences differ with Complementary Colour Harmony.
- H5:Preferences differ with Neutral Colour Harmony.
- H6: Best harmony preference varies across product types (bottled water, toothpaste, detergent powder).

Assumptions: The study assumed that respondents' choices would reflect real-life scenarios and that device screen variations would not significantly affect colour perception.

Materials: The Mockup used for the study was designed using Adobe Photoshop 2022 version according to colours and colour naming in colour wheels of previous studies.

Analysis: Data analysis was conducted using IBM SPSS Statistics 27 software, comprising two main parts. The first part involved descriptive statistics to summarize the data, which included

Figure 1 Designed Mockups of Products

frequency distributions and bar charts to visualize preferences for various colour harmonies. The second part focused on inferential statistics to examine relationships between variables, utilizing cross-tabulations and chi-square tests to assess associations and test hypotheses. 3D graphs were employed to visualize data distributions across multiple variables. The dependent variable in this study was product preference, reflecting consumer buying behavior, while the independent variables consisted of product packaging colours categorized into different colour harmony schemes: monochromatic, Analogous, complementary, split complementary, and neutral.

Method of existing Product packaging colour study

TinEye's Multicolour Engine[11] used to study the images of existing product packaging. it is a web-based tool designed for analyzing and extracting colour information from digital images, supporting formats such as JPEG, PNG, and GIF. It scans uploaded images to identify and quantify the most prominent colours, generating a comprehensive colour palette that represents the image's visual composition. For colour categorization, RGB ranges from B. Hilliard (2013)[5] were utilized; however, in instances where the tool could not properly identify certain colours, approximate categorization was applied to derive colour harmony.

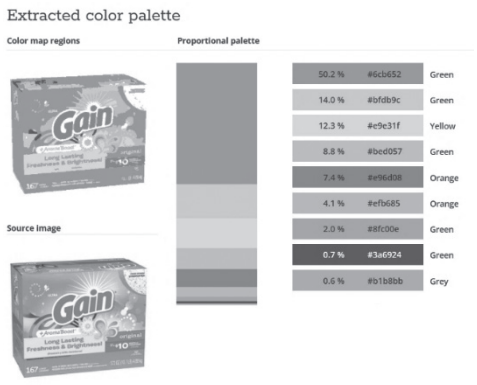

Figure 2 TinEye's Colour Extraction Tool

Results & Discussion

The collected responses are 100 and for the proper understanding of colour preferences and relationships each colour harmony studied separately and then for finding most and least preferred colour palettes, graphs were plotted over all colour harmonies for all product categories using weighted frequency method.

Analogous Colour Harmony

A Chi-Square test was conducted to assess the relationship between analogous colour harmony choices across Detergent Powder (DP), Bottled Water (BW), and Toothpaste (TP) categories. Significant associations were found for the first and second choices between DP and BW ($p = 0.013$ and $p = 0.011$), while the third choice

Table 1 Respondents Profile

Item	Frequency	%	
Gender	Male	53	53%
	Female	47	47%
Age	20-30 Years	83	83%
	30-40 Years	15	15%
	40-50 Years	2	2%
Religion	Buddhism	90	90%
	Catholic	5	5%
	Christian	2	2%
	Catholic & Buddhism	1	1%
	Not Specified	1	1%
Education	Bachelors	52	52%
	MSc.	31	31%
	Diploma	9	9%
	High School	8	8%
Income	0-50,000 LKR	29	29%
	50,000-100,000 LKR	29	29%
	100,000-200,000 LKR	22	22%
	More Than 200,000 LKR	20	20%

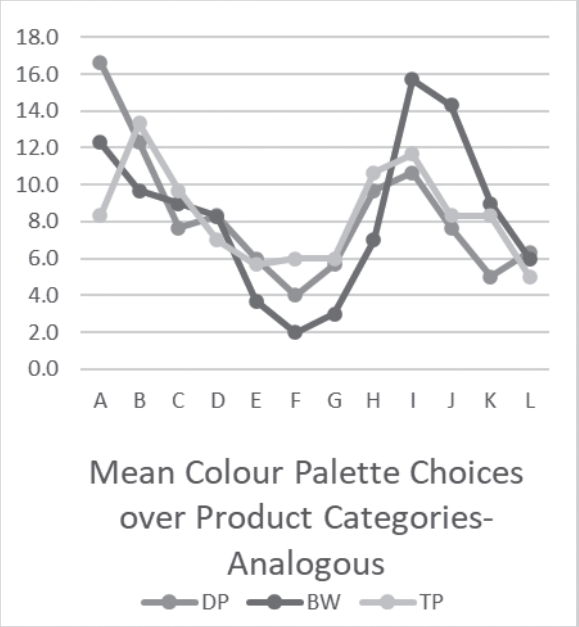

Figure 3 Mean Colour Palette Choices over Product Categories-Analogous

showed no significant relationship ($p = 0.071$). For BW and TP, all choices demonstrated significant relationships ($p = 0.001$, $p < 0.001$, and $p = 0.001$). Between TP and DP, the first and second choices were significantly related ($p = 0.004$ for both), but not the third choice ($p = 0.123$). Overall, seven out of nine comparisons indicated significant relationships. When the choices were combined into one variable, the Chi-Square test revealed a significant association across all product categories ($p < 0.001$). This suggests that analogous colour choices significantly influence product categories, though the frequencies of colour palette choices vary. Consequently, the null hypothesis was rejected, and the alternative hypothesis was accepted.

Across all product categories, respondents showed clear preferences for specific Analogous Colour Harmonies. For Detergent Powder, the top choice was (A) Yellow Green-Yellow-Yellow Orange, followed by (H) Purple-Blue Purple-Blue and (I) Blue Purple-Blue-Blue Green. In Bottled Water, (A) Yellow Green-Yellow-Yellow Orange was also the leading choice, with (I) Blue Purple-Blue-Blue Green and (J) Blue Blue-Blue Green-Green following. For Toothpaste, (A) Yellow Green-Yellow-Yellow Orange and (I) Blue Purple-Blue-Blue Green tied as the first choice, with (H) Purple-Blue Purple-Blue and (B) Yellow-Yellow Orange-Orange also popular. Overall, the most frequently selected harmonies across categories were (A) Yellow Green-Yellow-Yellow Orange, (I) Blue Purple-Blue-Blue Green, and (B) Yellow-Yellow Orange-Orange.

Monochromatic Colour Harmony

Significant associations were found for all three choices between DP and BW ($p < 0.01$, $p = 0.028$, $p = 0.008$), and for all choices between BW and TP ($p < 0.001$, $p < 0.001$, $p = 0.006$). Between TP and DP, the first and second choices showed significant relationships ($p < 0.001$ and $p = 0.013$), but not the third choice ($p = 0.37$). Overall, eight out of nine comparisons indicated significant relationships. When the choices were combined into one variable, the Chi-Square test revealed significant associations across all product categories ($p < 0.001$). This suggests that monochromatic colour choices significantly influence product categories, although the frequencies of colour palette choices differ across products. As a result leading to the rejection of the null hypothesis and acceptance of the alternative hypothesis Across the three product categories, respondents showed distinct preferences for Monochromatic Colour Harmonies. For Detergent Powder, Yellow and

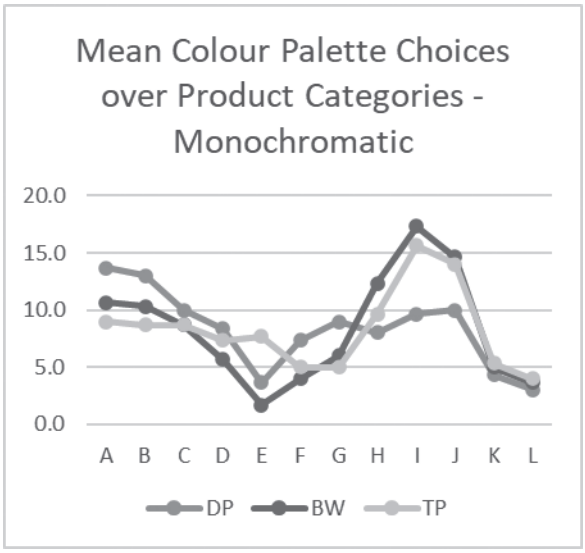

Figure 4 Mean Colour Palette Choices over Product Categories- Monochromatic

Blue were the top choices, with Yellow Orange and Blue Purple following. Bottled Water preferences were dominated by Blue, Blue Green, and Yellow, with Blue Purple also popular. Toothpaste saw Blue, Yellow, and Blue Green as the most preferred choices. Overall, Blue and Blue Green consistently ranked high across all products. Yellow was particularly favored for Detergent Powder and Toothpaste. In contrast, Red, Yellow Green, and Red Purple were generally the least preferred across categories. These results indicate that while there are some common colour preferences across products, specific product categories also influence colour harmony choices in monochromatic packaging designs.

Split-Complementary Colour Harmony

Chi-Square tests for Split-Complementary Significant associations were found for all three choices between DP and BW ($p = 0.01$, $p = 0.003$, $p = 0.026$), and for all choices between BW and TP ($p = 0.002$, $p = 0.009$, $p = 0.001$). Between TP and DP, the first and second choices showed significant relationships ($p = 0.006$ and $p < 0.001$), but not the third choice ($p = 0.287$). Overall, eight out of nine comparisons indicated significant relationships. When the choices were combined into one variable, the Chi-Square test revealed significant associations across all product categories ($p < 0.001$). This suggests that split-complementary colour choices significantly influence product categories, although the frequencies of colour palette choices differ across products. Consequently, the null hypothesis was rejected, and the alternative hypothesis accepted, confirming that Split-Complementary Colour Harmony preferences are significantly related across different product categories.

For detergent powder, the most favored combinations were Blue Green-Red-Orange and Green-Red Purple-Orange, with Blue-Red Orange-Yellow Orange ranking third. In bottled water products, Orange-Blue Green-Blue Purple, Blue Purple-Orange-Yellow, and Yellow Orange-Blue-Purple received the highest votes. For toothpaste, Orange-Blue Green-Blue Purple, Blue Purple-Orange-Yellow, and Green-Red Purple-Orange were the top choices. Across all products, colour combinations involving Red-Yellow Green-Blue Green, Red Orange-Green-Blue, and Purple-Yellow Orange-Yellow Green were consistently least preferred.

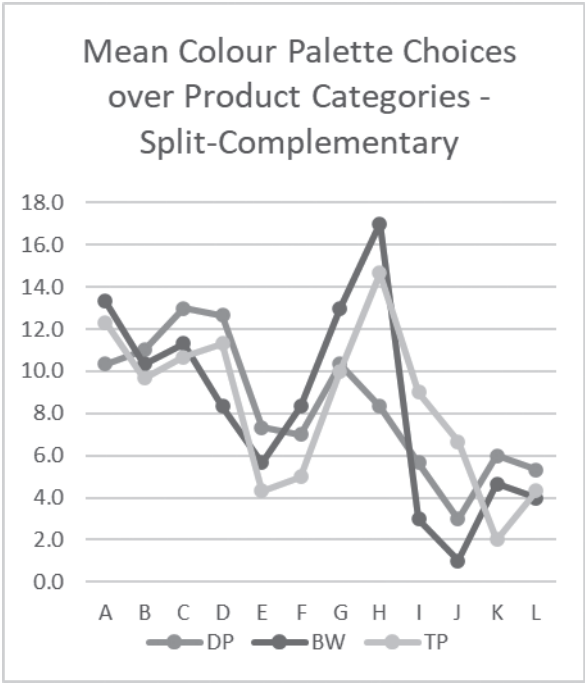

Figure 5 Mean Colour Palette Choices over Product Categories- Split-Complementary

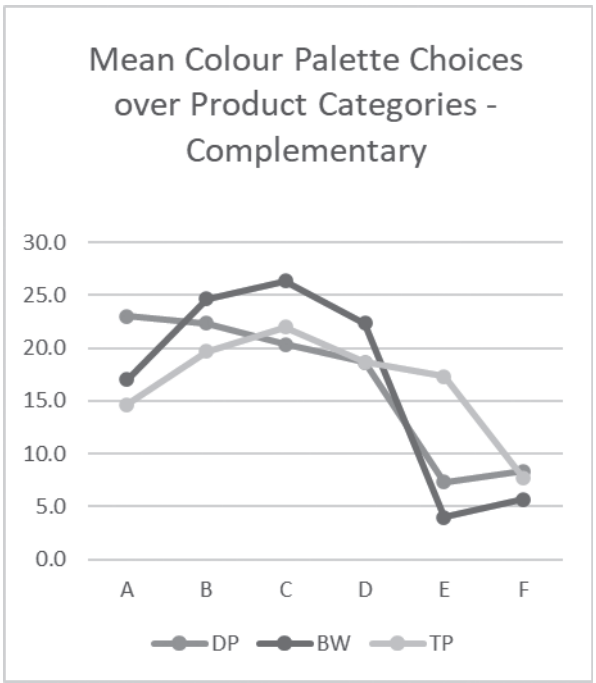

Figure 6 Mean Colour Palette Choices over Product Categories - Complementary

Complementary Colour Harmony

The Chi-Square test results indicated a significant association between the first and second choices of complementary colours for DP and BW, as both had a probability value of 0.017, which is below the 0.05 threshold. However, no significant association was found for the third choice ($p = 0.244$). In contrast, all three choices of BW and TP showed significant relationships, with p-values below 0.05 ($p < 0.001$, 0.003, and 0.006). For TP and DP, only the first choice showed a significant relationship ($p = 0.003$), while the second and third choices did not ($p = 0.2$ and 0.846, respectively). Overall, six out of nine comparisons indicated significant relationships. When the first, second, and third choices were combined into one variable, the Chi-Square test showed a significant association across all product categories ($p < 0.001$), suggesting that complementary colour choices significantly influence product categories, allowing the rejection of the null hypothesis in favor of the alternative hypothesis.

For detergent powder, Yellow-Purple, Yellow Orange-Blue Purple, and Orange-Blue were the top choices, while Red-Green and Red Purple-Yellow Green were least preferred. In bottled water products, Orange-Blue, Yellow Orange-Blue Purple, and Red Orange-Blue Green received the highest votes, with Red-Green and Red Purple-Yellow Green ranking lowest. For toothpaste, Orange-Blue, Yellow Orange-Blue Purple, and Red Orange-Blue Green were most favored, while Red Purple-Yellow Green and Yellow-Purple received the fewest votes. Overall, complementary colour schemes involving orange, blue, yellow, and purple were consistently popular across all products, while combinations with red and green were generally less appealing to consumers.

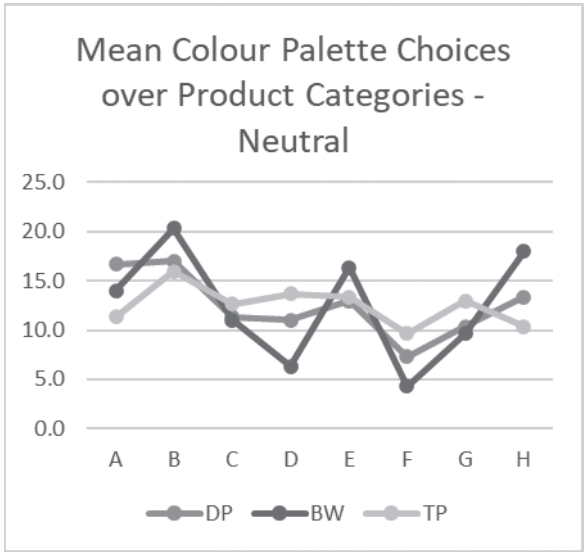

Figure 7 Mean Colour Palette Choices over Product Categories- Neutral

Neutral Colour Harmony

The Chi-Square results showed significant associations for the first and third choices between DP and BW ($p < 0.001$ and $p = 0.012$), and for the first and third choices between BW and TP ($p < 0.001$ and $p = 0.005$). For TP and DP, only the first choice showed a significant relationship ($p < 0.001$). Overall, five out of nine comparisons indicated significant relationships. When the first, second, and third choices were combined into one variable, the Chi-Square test

Table 2 Chi-Square Significance Values for Colour Palette Preferences

3rd Choice	2nd Choice	1st Choice		
0.071	0.011	0.013	DP*BW	Analogous
0.001	<0.001	0.001	BW*TP	
0.125	0.004	0.004	TP*DP	
0.008	0.028	<0.001	DP*BW	Monochromatic
0.006	<0.001	<0.001	BW*TP	
0.37	0.013	<0.001	TP*DP	
0.026	0.003	0.001	DP*BW	Split-Complementary
0.001	0.009	0.002	BW*TP	
0.287	<0.001	0.006	TP*DP	
0.244	0.017	0.017	DP*BW	Complementary
0.006	0.003	<0.001	BW*TP	
0.846	0.2	0.003	TP*DP	
0.012	0.054	<0.001	DP*BW	Neutral
0.005	0.066	<0.001	BW*TP	
0.327	0.142	<0.001	TP*DP	

Table 3 Chi-Square Values for Total Colour Palette Preferences
(1st Choice+2nd Choice+3rd Choice)

Neutral	Complementary	Split Complementary	Monochromatic	Analogous	Total Choices Values Chi-Square Test Results	
149.204	73.915	268.783	321.380	251.021	Value	DP* BW
49	25	121	121	121	df	
<.001	<.001	<.001	<.001	<.001	Asymptotic Significance (2-sided)	
142.980	114.031	262.917	341.739	313.425	Value	BW* TP
49	25	121	121	121	df	
<.001	<.001	<.001	<.001	<.001	Asymptotic Significance (2-sided)	
131.179	49.301	225.319	265.340	252.922	Value	TP* DP
49	25	121	121	121	df	
<.001	<.001	<.001	<.001	<.001	Asymptotic Significance (2-sided)	

revealed.

significant associations across all product categories ($p < 0.001$). This suggests that neutral colour choices significantly influence product categories, although the frequencies of colour palette choices differ across products. Consequently, the null hypothesis was rejected in favor of the alternative hypothesis.

For detergent powder, Grey-White-Black, White-Black-Brown, and White were the top choices, while Brown and Black were least preferred. In bottled water products, Grey-White-Black, White, and Grey received the highest votes, with Brown and Black-Brown-Grey ranking lowest. For toothpaste, Grey-White-Black, Black-Brown-Grey, and Grey were most favored, while Brown and White received the fewest votes. Overall, combinations involving grey, white, and black were consistently popular across all products, while pure brown or black were generally less appealing to consumers. The findings suggest that consumers tend to prefer multi-tonal neutral colour schemes for household products, with a particular preference for combinations including grey and white.

Best Colour Harmony Preference

The Chi-Square test results reveal a significant relationship between colour harmony preferences across detergent powder, bottled water, and toothpaste products, with p-values less than 0.05 for all colour harmonies. Neutral Colour Harmony emerged as the most preferred choice overall, particularly for detergent powder (34%) and bottled water (37%). Toothpaste products, however, saw a preference for Analogous Colour Harmony (27%). In general, Neutral Colour Harmony (32%) was the top choice across all products, followed by Monochromatic (24.67%) and Analogous (23%) Colour Harmonies. Split Complementary (5.33%) harmony consistently ranked as the least preferred option for all three product categories.

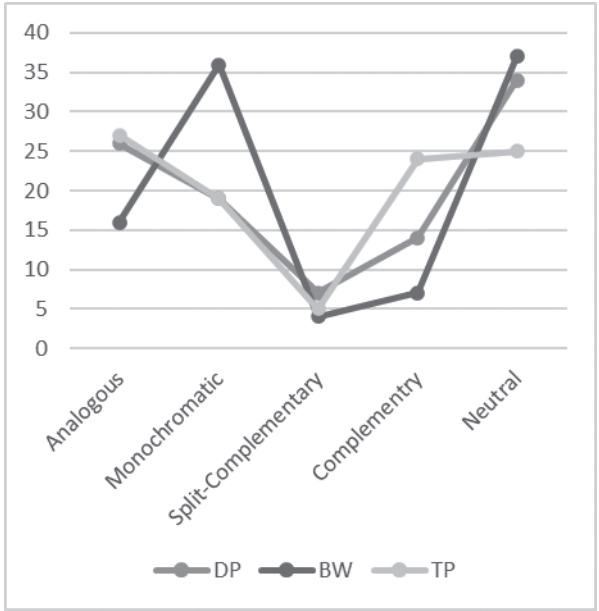

Figure 8 Best preferred Colour Harmony across Product categories

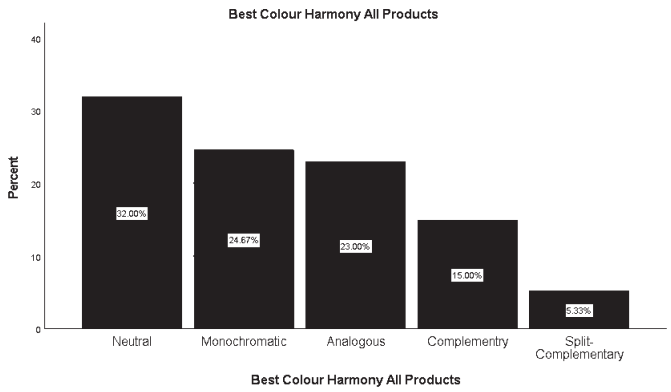

Figure 9 Best preferred Colour Harmony - Overall

Gender, Income Level, Education & Favorite Colour

Chi-square tests were conducted to examine relationships between demographic factors (Gender, Income Level, and Education) and colour choices across all product and colour categories. All p-values were above 0.05, indicating no significant relationships. 3D graphs of Best Harmony choice versus these demographic factors showed no significant variations. However, neutral colour harmony was notably preferred among males and across all income and education levels.

Previous studies by Saito (1996), Jonauskaite et al. (2020), and Palmer & Schloss (2010) have shown that blue and green are universally preferred colours, with some regional and cultural variations. These preferences are influenced by emotional associations and environmental experiences, as explained by the Ecological Valence Theory. Our study aligns with these findings, with blue being the most frequently mentioned colour, followed by green and white.

Despite the alignment with previous studies on colour preferences, our Chi-Square test for favorite colours versus colour palette preferences showed no significant relationship ($p > 0.05$) for all colour harmonies. This suggests that while individual colour preferences exist, they may not directly translate to preferences for specific colour harmonies in product packaging.

Most and Least Preferred Colour Palettes for Product Categories

To identify the most preferred color palettes among different color harmonies weighted frequency method were used. Examined harmonies were varying with different sample sizes: To normalize these differences, the frequencies were adjusted to the standard of 12 samples using the formula:

Normalized Frequency = (Observed Frequency × Number of Existing Samples) / 12

This approach allowed us to accurately compare color preferences across harmonies, ensuring reliable results despite the varying sample sizes.

For detergent powder, the most preferred colour palette was Yellow Green-Yellow-Yellow

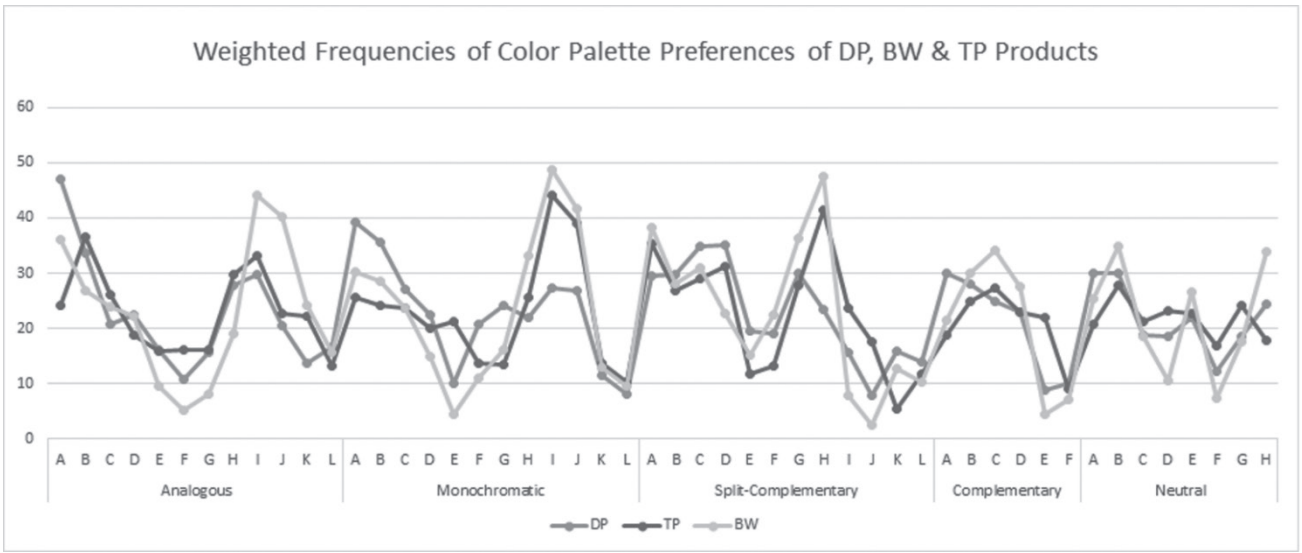

Figure 10 Weighted Frequencies of Colour Palette Preferences for DP, BW, TP Products

Orange from the Analogous harmony (n=46.92), followed by Monochromatic Yellow (n=39.17) and Monochromatic Yellow Orange (n=35.5). The least preferred was Split-Complementary Red-Yellow Green-Blue Green (n=7.83), followed by Monochromatic Yellow Green (n=8.08) and Complementary Green-Red (n=8.83).

In bottled water products, Monochromatic Blue was the top choice (n=48.75), followed by Split-Complementary Orange-Blue Green-Purple (n=47.58) and Analogous Blue-Blue Purple-Purple (n=44.08). The least preferred were Split-Complementary Red-Yellow Green-Blue Green (n=2.58), Monochromatic Red (n=4.5), and Complementary Green-Red (n=4.58).

For toothpaste, Monochromatic Blue was most preferred (n=44.0), followed by Split-Complementary Orange-Blue Green-Purple (n=41.5) and Monochromatic Blue Green (n=38.92). The least preferred were Split-Complementary Red Purple-Yellow-Green (n=5.58), Complementary Yellow Green-Red Purple (n=9), and Monochromatic Yellow Green (n=10.33).

Reasons For Bottled Water Best Colour Harmony Choices

For detergent powder, colour palette preferences were primarily driven by visual appeal, with "Eye Catching" and "Attractive" being significant factors. Practical considerations like "It Matches with the Product" and "Easy to Identify" were also important. Personal preferences and aesthetic enjoyment played a role, as did simplicity and clarity. Overall, respondents favored colours that symbolized cleanliness, aligned with product branding, and stood out visually.

In bottled water products, colour choices were influenced by aesthetic appeal and practical associations with water. "Attractive," "Eye Catching," and "It Matches with the Product" were frequently mentioned. Blue was particularly favored for its connection to water and representation of purity and freshness. Simplicity, cleanliness, and natural associations were key themes, with light and neutral hues being preferred.

For toothpaste, colour preferences balanced aesthetic appeal with practical considerations and personal experiences. Visual attractiveness and product relevance were important, as were familiarity and long-term buying experiences. Green and red hues were popular due to their association with natural ingredients and freshness. Respondents appreciated colours that evoked cleanliness, effectiveness, and stood out on shelves, while also valuing simplicity and easy visibility.

Across all products, "No Special Reason" was frequently cited, indicating that many respondents didn't have specific rationales for their choices. This suggests that subconscious preferences or general appeal may play a significant role in colour palette selection for household products.

Meanings and Associations with Colours

For detergent powder, colour preferences reveal strong associations with personal experiences and emotions. Yellow is favored for its confidence-boosting qualities and nostalgic ties to childhood. Blue is linked to water and evokes a calming effect, while green is preferred in lighter shades. Consumers appreciate colour combinations like blue and yellow, which symbolize water and sunlight, and tend to choose monochromatic patterns across various products. Overall, blue, white, and yellow emerge as the most favored colours, reflecting cleanliness and vibrancy, while green and purple add freshness and sophistication.

In bottled water products, blue dominates as the preferred colour, symbolizing purity and cleanliness, and evoking memories of nature and childhood. White complements blue by reinforcing themes of simplicity and freshness. Consumers also appreciate light colours for their cool and natural associations. The combination of blue and

white is particularly effective in packaging, enhancing the perception of healthiness and environmental friendliness. Green is noted for its connection to nature, while purple provides a touch of sophistication.

For toothpaste, blue remains the most popular colour, associated with cleanliness and freshness, and often linked to childhood memories. Green is favored for its minty freshness, while white serves as a neutral and clean option. Purple, especially when combined with red, conveys energy and invigoration. Personal preferences play a significant role in colour choices, with many users gravitating towards familiar colours without specific associations. The findings suggest that blue, green, and white should be prioritized in toothpaste packaging design, with purple and orange as potential accent colours to broaden appeal.

Colour Suggestions for Products

For detergent powder, light green is the most favored colour, often considered attractive. Other popular choices include yellow, blue, white, and purple, frequently paired together to enhance the product's appeal. Combinations like blue and white, yellow and white, and green with lighter shades are particularly recommended for their harmonious and complementary qualities. Monochromatic themes are preferred for their simplicity, while specific colour suggestions cater to product types, such as green for lime-based products and light rose for floral variants. The overall trend leans towards lighter, non-dark colours to maintain visibility and market appeal.

In bottled water, blue and white dominate as the preferred colour combination, symbolizing water, calmness, and purity. Light blue paired with white is also popular, reflecting a fresh look. Green and white combinations are linked to nature and freshness, while purple and transparent labels are less common but suggest a modern touch. The preference for these colours aligns with market trends, indicating consumer trust and comfort. Light, simple designs are favored, reinforcing the trend towards minimalism in packaging For toothpaste, blue and white are again the leading colour choices, associated with cleanliness and trustworthiness.

Table 4 Extracted Keywords from Qualitative Data

	DP	BW	TP
Reason	Eye-catching Attractive Pleasant Clean Colour Harmony Simple Identification Favorite Vibrant Suitable	Natural Pure Eye-catching Attractive Suitable Calming Light Simple Identification Vibrant	Eye-catching Suitable Pleasing Familiar Natural Attractive Simple Identification Favorite Clean
Meanings and Associations	Confidence and Positive Feelings Familiarity and Popularity Favorite Colours and Personal Preference Water Association Cleanliness and Purity Memory and Experience Attractiveness and Eye-catching Natural and Cool Feel Market Trends Versatility and Uniformity	Water Association Familiarity and Tradition Purity and Cleanliness Environmental Friendliness Favorite Colours and Personal Preference Natural and Calming Feel Brightness and Visibility Market Trends Childhood Memories Consistency and Uniformity	Favorite Colours Familiarity and Recognition Minty and Freshness Eye-catching and Attractive Natural and Clean Feel Childhood Memories Real World Scenario Energetic and Invigorating Consistency with Other Products No Specific Reason
Colour Suggestions	Blue White Light Blue Green Yellow Purple Pink Light Green Gold Dark Blue	Blue White Light Blue Green Dark Blue Sky Blue Ash Blue Purple Orange Peach	Blue White Green Red Maroon Sky Blue Pink Dark Blue Black Grey

Other combinations include blue with red for vibrancy and sky blue with white for a fresh appearance. Green is favored for minty flavors, while maroon and pink are occasionally mentioned for their distinctiveness. The consumer trend favors clean designs with blue and white, while some prefer bold contrasts using dark colours. Personalizing packaging colours based on flavor enhances consumer appeal, emphasizing the importance of aligning packaging with consumer expectations.

Existing Products study

An analysis of colour harmony in consumer brands across detergent powders, bottled water, and toothpaste in the international market reveals distinct strategies. Detergent brands like Gain use yellow-green hues, while Tide and Ariel employ vibrant split-complementary schemes. Foca and Roma favor monochromatic blue with red accents, and Arm & Hammer uses complementary blue and orange. In bottled water, Dasani and Aquafina opt for monochromatic blue, while Volvic and Perrier use green for eco-friendliness. Toothpaste brands like Colgate and Sensodyne utilize red and blue monochromatic schemes, respectively, with Crest also incorporating blue and red. Pepsodent employs a split-complementary mix, and Aquafresh uses a triadic scheme. These colour strategies effectively communicate attributes like cleanliness and freshness, influencing consumer perceptions.

In the Sri Lankan market, consumer product packaging for DP, BW, TP products also demonstrate strategic use of colour harmonies. Detergent brands like Rin and Diva use triadic colour schemes, while Sunlight and Tide opt for split-complementary schemes. Surf Excel employs a complementary blue-orange palette. Bottled water brands predominantly use monochromatic blue schemes, with Elephant House diverging to green. Toothpaste packaging largely favors monochromatic schemes, as seen in Signal and Sensodyne's blue palettes. CloseUp stands out with a vibrant red-blue combination, while Clogard uses a complementary green-red scheme. Ayush and Supiriviky incorporate natural tones, and Knuckles and Star Light use monochromatic red schemes. The best colour preferences for all the categories aligned with some existing colour palettes of product packaging.

Discussion

The study of colour harmony in consumer preferences reveals significant insights into how different colour schemes influence product appeal. Across various products, analogous colour harmonies, such as yellow-green and blue-based combinations, are generally favored, though preferences can vary by product category. For instance, detergent powder shows a stronger preference for yellow-green harmonies compared to bottled water, which favors both yellow-green and blue-based harmonies. Monochromatic colour preferences also show significant relationships across products, with blue and yellow being the most popular choices. However, preferences can vary, with blue being more favored for bottled water and yellow for detergent powder. Split-complementary colour schemes, which involve contrasting warm and cool colours, also show significant relationships, with preferences varying by product. The least favored combinations often include clashing colours like red, yellow, and green. Complementary colour preferences show partial relationships across products, with classic pairings like yellow-purple and orange-blue being favored. Neutral colour harmonies, particularly combinations of white, gray, and black, are strongly preferred for products like detergent powder and bottled water, likely due to associations with cleanliness and purity. Overall, neutral harmonies are the most preferred, followed by monochromatic and analogous harmonies, while split-complementary harmonies are the least favored.

The survey findings on DP, BW and TP packaging generally align with existing product designs in the market. For detergent powder, the

preference for yellow-green and blue-based harmonies matches popular brands like Gain, Tide, and Ariel. Bottled water survey results favoring neutral and monochromatic blue schemes correspond with major brands like Dasani and Aquafina, though some brands also incorporate green hues. In toothpaste packaging, the survey's preference for monochromatic blue schemes is reflected in brands like Tom's of Maine and Sensodyne. Overall, the survey results demonstrate that consumer preferences largely match current market trends in packaging design across these product categories

Conclusions and Future Work

Implications

The implications of the colour preference data for FMCG products suggest several strategic approaches for companies. Brands can utilize the survey methodology to conduct market research tailored to their specific contexts, ensuring relevance and accuracy. Consistency in colour palettes across product categories can reinforce brand image, while new entrants can leverage the identified colour schemes for their packaging designs. Design strategies should prioritize simplicity and neutral or monochromatic palettes, particularly for household essentials, to align with consumer preferences for clarity and purity. However, product-specific customization remains important, such as incorporating yellow-green hues for detergents or vibrant schemes for toothpaste. Marketing efforts should emphasize colours that reinforce product attributes like cleanliness and freshness. Understanding consumer psychology regarding colour harmonies can guide product launches and rebranding initiatives. Finally, brands operating in diverse markets should consider regional differences in colour preferences to enhance local acceptance and brand loyalty.

These findings and methods will be particularly beneficial for Sri Lankan companies by utilizing the potential colours identified in this study for their packaging. The methodology introduced can help determine specific product packaging colours, as it avoids costly trial-and-error methods in packaging design. Designers can constructively apply these insights to enhance marketing and branding strategies. By leveraging psychologically and culturally relevant colours, companies can improve product performance and drive successful first-time purchases in the market. This approach offers a competitive advantage over other brands. Also this study found that neutral colours hold significant potential, making them ideal for use in eco-friendly packaging, which supports both environmental sustainability and product success in Sri Lanka.

Limitations

The use of personal devices for the survey may have introduced variations in how respondents perceived colours due to differences in screen quality and settings. Additionally, respondents' stress levels and potential distractions during the survey could have affected their responses. The research was conducted with a limited sample size and did not account for factors such as price, brand awareness, or product quality, which could influence colour preferences in real-world scenarios. The findings may have broader applicability but might vary when considering premium products, limited editions, or specific target markets.

Conclusion

This research on packaging colour harmony for FMCG products in Sri Lanka reveals a strong consumer preference for simplicity and clarity across all categories. Neutral and monochromatic colour palettes were most favored, aligning with major brands' existing strategies and associating with cleanliness and purity. Product-specific preferences emerged, with detergents leaning towards yellow-green, bottled water favoring blue, and toothpaste showing a preference for

analogous harmonies. Bold and clashing colour combinations were generally unpopular. The findings suggest that FMCG brands should prioritize clean, simple designs with neutral or monochromatic palettes, while incorporating subtle product-specific variations. Emphasizing dominant colours in marketing can reinforce desired product attributes. While the study has limitations, including potential screen variations among survey respondents, it provides valuable insights for optimizing FMCG packaging design in the Sri Lankan market may helpful for other contexts as well.

Future Work

Future research on the impact of packaging colour harmony in the FMCG market could explore several areas. Expanding the scope to include a wider range of products beyond detergent powder, bottled water, and toothpaste would provide a more comprehensive understanding of colour preferences across different categories. Additionally, incorporating a broader range of colour harmonies, such as tartaric, triadic, and square, could enrich the findings. Investigating the influence of price on colour preferences and incorporating a larger, more diverse sample would enhance the generalizability of results. Exploring regional variations could offer insights into global and local trends in colour preferences. A deeper analysis of existing FMCG products' colour strategies could reveal effective colour choices and trends, providing valuable lessons on consumer behavior and brand identity. Addressing these areas could deepen our understanding of how colour harmony affects consumer behavior in the FMCG market globally, empowering brands to design aesthetically pleasing and commercially successful packaging.

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