Visual Cognition and Marketing: How Color Psychology Affects Memory Retention

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Abstract: *This conceptual research paper explores the amalgamation of visual cognition, color psychology and memory retention in aspects of marketing. This paper will attempt to propose a unified model drawing from various theories such as Dual -Coding Theory, Levels of Processing, and the Color-in-Context framework to explain how consumers can process, encode and retrieve visual stimuli primarily influenced by color, this paper will check for critical theoretical gaps including memory color effect, cultural variability in color interpretation and the trade off between contrast and being appropriate in design, this study will offer a foundation for future empirical studies, insights gained will most significantly have implication on various facets of marketing such as branding, advertising and digital media strategy.*

Keywords: *Color Psychology, Visual Cognition, Memory Retention, Dual-Coding Theory, Brand Recall, Neuro-Marketing,Consumer Perception*

INTRODUCTION

Colors have played a very prominent role in our evolution as a society , we as a species have been across generations interested in assigning certain cultural and religious significances to colors , in marketing colors not only speak volumes about the brand's identity , but they also evict in us the emotion and relationship with the company . Color here is not a mere tool for marketing , it is very potent psychological tool that influences consumer perceptions, attention and recall in memory, it is quite evident from our own personal experiences that if we have not been conditioned and based on impulse we will always get attracted to colors and judge them to be the best for our needs, as per the study consumers are able to make a subconscious judgement on a product within the first 90 seconds and to add to that at 90% of the time we are able to assess them based on color alone(Singh, 2006) We do know that we are attracted to color not merely because they are attractive and they do not carry any meaning in isolation, the more important aspect is the psychological influence which is premeditated from its context in which it is perceived, like in most cases when we talk about the color Blue we associate it with trust , reliability and professionalism in a corporate setting , whereas in a medical setting it evokes calmness and reduces patient anxiety, similarly color such as Red evokes passion and attractiveness in whereas in a test taking scenario it may evoke a sense of failure or anxiety (Elliot & Maier, 2012)warm colors in most cases have been shown to enhance attention and retention in our memory performance , they in most cases induce a higher level of arousal and in most cases there improvement in cognitive engagement with the surrounding stimuli , however what we need to always remember is the context since prolonged exposure could lead to anxiety, overstimulation if not balanced properly (Dzulkifli & Mustafar, 2013)Color in marketing exerts a powerful influence in attracting responses , this happens even before there is cognitive processing, color enables us to use it as a non-conscious driver to behave in our purchase cycle, we are able to register sensory information automatically and quickly and in most cases this happens without any attention or a deliberate thought , for instance a consumer walking past a retail display might instantly feel attracted or repelled based on the color scheme, even before recognising the brand or product. Warm tones like Red or Black may evoke different kind of emotions, while cool tones like green and blue can communicate ease, calmness etc, these implicit emotional impacts are what shapes our brand perceptions and purchase intentions and since this effect occurs quickly marketers can use color as a silent yet powerful marketing cue to influence consumer decisions even before verbal or rational messaging.(Labrecque & Milne, 2013). Research in cognitive neuroscience and behavioural marketing suggests that Colors plays an Important role in visual cognition – the bare brain processes and interpret visual information, despite the intuitive appeal of Colors impact on our memory retention the theoretical exploration of this relationship remains fragmented hence this paper aims to bridge the gap by synthesising cognitive theories and psychological models to better understand how colour contributes to effectiveness in marketing

THEORETICAL   FOUNDATIONS

2.1 Dual-Coding Theory (Clark & Paivio, 1991)

Dual coding theory proposed by Clark and Paivio, put forward that human cognition processes information through two distinct but interrelated systems. The first one being a verbal system which is used for language based information and the second one a non-verbal system which is used for imagery and visual representation. According to them learning and memory

are both enhanced when information is encoded simultaneously verbally and visually as it creates two retrieval parts/pathways in the brain. For example when someone is presented with a concept which is explained in a text format along with the relevant image, it is most likely that they will understand and retain this material compared to just text alone.This dual representation strengthens comprehension and recall by engaging both linguistic and visual cognitive resources. In the context of let's say education multimedia learning and especially marketing dual coding theory provides a very strong justification for integrating visual aids such as icons, charts, product visuals, or instructional graphics. These visuals don't just complement the text but they can engage with the audience or consumers at an entirely different cognitive channel, where they reinforced the message and makes it more memorable

2.2 Levels-of-Processing Framework (Craik & Lockhart, 1972)

Craik and Lockhart proposed the levels of processing framework, They proposed that memory is retained not just by determining how long the information is stored but also by how much depth of cognitive processing it undergoes, What does this means is when information is processed at a deeper, semantic level, It is more than likely that this will be remembered rather than information processed at a shallow or surface level. In marketing this theory highlights one of the most important aspects of creating content that encourages deep consumer engagement for instance, advertising always tells the story that uses any emotional appeal or connects with the identity or values of consumers and is more likely to be retained in long-term memory than advertisements which rely solely on flashy visuals and repeated slogans. A campaign can only be successful when the consumers are invited to reflect, associate the brand with a personal experience or helps them solve a problem which engages them in a depot processing of this information,This can be seen in almost all the successful strategies such as interactive brand experiences, user generated content, value driven storytelling which all facilitate semantic encoding and thereby increases brand recall, hence the levels of processing framework enhances the idea that marketing content should not just be aesthetics but should aim to foster meaningful cognitive and emotional connections for an impact which lasts longer than usual

2.3 Color-in-Context Theory (Elliot, 2012)

The Color-in-Context Theory , proposed by Elliot, states that psychological meaning and in fact of colour are not fixed but are highly dependent on the situational context in which the colour is proceed.There is an earlier theories They assigned universal emotional meanings to colour(For Eg., Red equals danger or passion)This theory emphasises that a single colour can evoke different reactions responses depending on the contextual cues and relevant goals. In marketing this theory provides a critical lens for use of strategic Colors in advertising packaging branding and digital design. For instance:

● The colour Red might Stimulate excitement and urgency in a clearance sale whereas in a financial application it might signal error or caution
● The colour Green might evoke friendliness or a sense of ease in a product packaging whereas in the financial application it might signify profit or prosperity.

The colour and context theory hence helps marketers to go beyond the usual colour/cultural generalisation and Instead evaluate how a colour may be perceived in the specific context of the message, medium, and target audience this will enable the marketer to have a clearer and more focused approach to using colour in context.This theory supports a more nuanced, psychologically informed decision about colour usage where it is more effective and emotionally resonant in the marketing outcome

3. Visual Cognition and Color Memory Mechanisms

3.1 Memory Color Effect (Granzier & Gegenfurtner, 2012)

Granzier and Gegenfurtner in their study of Memory Color Effect discussed the phenomenon where our knowledge of an object's typical color Influences how we perceive and interpret its actual colour.In other words prior memory associations can distort visual perception, People tend to see an object as having its expected colour even when its true colour differs slightly. For example people generally perceive An apple to be more red than it actually is this is due to the strong mental association between the object and its canonical colour.This cognitive bias shows to us the interaction between memory and perception, where the brain actively corrects or adjust sensory input based on already stored knowledge, In marketing this effect holds a very significant implications for not just branding but also for advertising and more importantly product packaging.Consumers most of the time expect products to appear in their memory consistent Colors(Example blue for Pepsi, Sprite is Green),It's only when the colour deviates from the expectations it can lead to cognitive dissonance or reduce stress or in most cases rejection of the product. Conversely aligning the memory colour can enhance recognition, perceived authenticity and purchase likelihood, Hence the memory colour effect helps us understand the importance of colour consistency and expectation management in visual branding strategies, reinforcing the idea that colour is not just important but it is cognitive and cultural and not limited to a visual spectrum.

Witzel In his 2016 study proposed an evaluated simple yet efficient stimulus display designed to measure the memory colour effects, This phenomenon was where object knowledge and memory influenced colour perception, Unlike only studies that relied extensively on time consuming experimental set ups, Witzel's method offered a more quick and practical approach that maintain the scientific rigger while being more accessible for broader applications. This method involving presenting observers with familiar, canonically coloured objects(Example bananas ,strawberries, carrots)and Testing how their perception of these objects colour is biased by prior knowledge, The fascinating find is that participants tend to adjust the objects colour towards a more neutral or a gray tone but their judgements were systematically influenced by their memories of the objects correct colour even when the Stimulus is desaturated or ambiguous. The simple experiment design is highly valuable for applied research fields including marketing design and user experiences in understanding how memory influences color's perception and can

help companies build brand colour choices, product designs, and skew consumer expectation. By offering a fast and scalable approach , this study helps us understand more about the implicit cognitive biases in visual perception , bridging laboratory research with more real world applications(Witzel, 2016)

3.2 Picture Superiority Effect

Among all the well-established psychological phenomena the Picture Superiority Effect is well established in making us understand about images being more easily remembered than words. This effect has been consistently observed across all age groups, contexts and any cognitive tasks. Visual encoding in memory has a unique strength in helping us retain and recall. In a seminal Study (Paivio & Csapo, 1973) demonstrated that Participant showed significantly better recall for pictures whereas compared to words, even when both were matched for semantic content, These findings provided a foundational support for what we now known as dual coding theory, Which suggest that image is benefited from dual representations in the brain affecting both visual and verbal cues whereas words are typically processed only through verbal channel unless deliberately visualized, In the context of marketing education and communication the pictures superiority effect the importance of how a visual content enhances a message retention, For example infographics, icons, product visuals and brand imagery are more likely to be retained in memory by consumers than any other textual descriptions alone. This is particularly irrelevant in advertising packaging and digital design where the consumers attention is for a very short time, Thus leveraging the Picture Superiority Effect allows marketers to optimize content for memorability and impact and thereby enhances the visuals as a strategic   asset   in   cognitive   engagement.

3.3 Von Restorff Effect (Isolation Effect) (Kroll, 2013)

 The Von Restorff Effect, also known as the Isolation Effect Refers to the psychological principle that items that stand out from their surroundings are more likely to be noticed and remembered, This isolation effect is well known to most of us when we visit any particular malls shops or any other areas where we'd like to select or buy anything of interest, Most of the products and companies utilise this to good effect by ensuring that their products stand out from other competing products, Originally identified by Hedwig Von Restorff in 1933 was later explored by researchers including Kroll, This effect emphasises how distinctiveness enhances memory encoding. According to Kroll to attract greater attention and deeper cognitive processing resulting in a superior recall one has to have a stimulus which differs significantly from a group of similar items beat in colour, shape, size, font or context, This effect operates through perceptual salience and attention capture which elevate the isolated items status in our memories. In marketing and advertising the one restore effect is strategically used to ensure these key elements such as call to action, brand names, discounts, or visual logosWhich helps them stand out from all the clutter for example a dark Red "Discount now" button on an lightly blue colored website , or a unique shaped product on a uniformed shelf , can be leveraged to enhance visibility and impact, we have consistently seen IKEA do these with their unique home furnishings , By intentionally creating a conceptual contrast or visual marketers can now amplify message retention and engage the consumer, making the Von Restorff Effect a powerful tool in UI design branding, packaging and content marketing

4. Marketing Applications

4.1 Brand Identity and Color Association

Brand identity is the strategic expression of a brands core values and positioning through its many functions such as visual, verbal, experiential elements, These can be logo, typography, colour palette, tone and or packaging(Aaker, D. A. (1996). *Building strong brands*. Free Press. (Aaker, 1996) (Kapferer, 2012). In Marketing , Grand identity plays a very important role in shaping consumer perception, building emotional residence and driving brand loyalty, many firms Spent a lot of time and money on building a cohesive brand identity which will not strengthen their brand recall considering that they could be in a crowded market where the possibility of products being same are high, hence there needs to be visual consistency and engagement of this over all platforms , be it social media, website or any packaging, this will enable the consumer to trust your brand and helps in repeat engagements, also a distinct identity in itself helps the brand differentiate itself from various competitors such as Tesla and Apple and helps consumer understand its value proposition instantly.

Color associations has since long been associated with it being a psychological and emotional tool used by marketers , wherein specific colors are utilised to impact consumer behavior , brand perception and induce purchase intent.(Elliot & Maier, 2012) especially in marketing color is one of the most immediate and non-verbal cues a brand can use to shape perceptions and trigger emotional responses, It is well known that Colors can influence consumer decisions within the first 90 seconds of first contact and makes up his mind 85% of the time. It is imperative that colour choices should not confuse or alienate the target audience especially if they clash within cultural or contextual expectations, misaligned colour choices can be disastrous if not being factored properly.

4.2 Emotional Framing and Consumer Behavior

Emotional framing refers to the strategic representation of information in a way that triggers specific emotional responses, which in turn influences consumer attitudes, decision-making, and behaviour.Framing can either be positive(gain) or negative(loss) and it is widely used in marketing to guide perception and motivate action (Lerner et al., 2014)

Consumers most often than not rely on emotions rather than logic while evaluating brands especially when the conditions of time pressure, uncertainty, or product overload are felt, emotional framing helps brands position themselves (Seo et al., 2010), positive emotional framing such as joy, hope,inspiration etc are effective when we are associated with lifestyle and aspirational brands ,for eg: Lifestyle Fashions, Gucci etc. Negative emotional framing meanwhile works well when it is used in public announcements,insurance products or anything related to health , wherein the response required is more urgent and mostly in

cases of risk avoidance For example anti-smoking campaigns. When emotional narratives in advertisements are used in most cases foster greater message retention, brand attachments and lead to higher conversion rates and board of mouth referrals (Escalas & Bettman, 2015) , Also when it comes to premium and lifestyle segments if the perceived value of the brandIs framed emotionally there is more benefits compared to functional features.In today's digital marketing world it becomes critical that more and more marketers use emotional framing where the algorithms in most cases favourite content that evokes strong reactions and drive higher engagement and virality.

4.3 Color Consistency Across Platforms

Colors consistency is not just important in the print but also in the digital world it is a critical part of any brand identity, it possesses a significant challenge due to its technological variations.Factors such as screen calibration, lighting, resolution, print material quality can all affect how brand Colors appear to consumers, potentially the starting brand perceptions and recognition((Labrecque & Milne, 2013),hence it becomes very important that there is consistency wherever the source material is derived and produced and easily available, whenever colour reproduction is done It is imperative to stick to the same dimensions colour palette or raw materials to create the same effect otherwise inconsistent colour reproduction can lead to confusion, we can brand recall and undermine consumer trust, particularly in a visual first categories such as cosmetics fashion and technology. E-commerce brands are critically evaluated on especially these issues when there are colour discrepancies between what is digitally viewed and physically product received, hence this leads to product returns, negative reviews or loss of credibility, To maintain visual fidelityBrands must adopt strategies in their design which includes use of colour calibration profiles, safe palettes and pantone colour matching for prints, styles guides for brands But clearly defined CMYK, RGB and HEX codes ensures consistent implementation across all touch points, hence maintaining color consistency supports a cohesive brand experience across all media formats and devices, which also reinforces the brand professionalism, attention to detail, and commitment to quality

CONCEPTUAL GAPS AND FUTURE RESEARCH DIRECTIONS

5.1 Integration Gap

Despite ample literature available on colour perception cognitive processing, emotional response there still remains a significant gap in understanding of a unified theoretical model that synthesiseInsights from neuroscience, cognitive psychology and marketing .Existing framework tend to be more discipline specific often isolating Colors affective , attentional or behavioural roles rather than considering the interdependent impact on consumer contexts (Elliot, 2012) (Labrecque & Milne, 2013).Where colour cues influence consumer behaviour non-consciously there is a conceptual gap which limits predictive accuracy in campaign design, product packaging and digital branding,And without interdisciplinary models most marketers may not understand the contextual effects of colour on memory, emotion and decision-making When particularly in a society similar to India where there is heavy influence of cross cultural and a multi platform environment. Colour based differentiation strategies Would considerably benefit from using neurological activation (example arousal from red), memory bias(eg., Memory Color Effect) and Digital realism(screen based Inconsistencies). There has to be a development of integrative models that align neural imaging data, effective metrics and the consumer behaviour analytics Which would significantly enhance and strengthen the colour strategy in marketing, Longitude and cross modal studies should explore How across media, consumer life cycles and cultural settings can be explored with the interactions of colour.

With the onset of artificial intelligence and AI driven personalisation colour psychology could open entirely new avenues and a hyper targeted advertising could create an immersive brand experience the likes of which the world has never seen.

5.2 Cultural Variability

The psychological and symbolic meanings of Colors are not universalThey are in fact sometimes deeply rooted in cultural traditions, historical experiences and local belief systems. This cultural specificity creates complex challenges for global brands seeking consistent yet locally resident visual identities.One of the most simple but very profound paradox can be seen with the colour white which typically symbolises in the western world purity, cleanliness and new beginnings whereas in most several East Asian cultures white is the colour of moaning and death (Aslam, 2006)

colour helps play a crucial variable in cross border e-commerce where users from different countries interact with the same digital interface, maintaining a culturally optimised colour strategy across websites, apps and social media platforms not only establishes emotional connection but enhances usability. When we talk about underlying psychological mechanisms and social cultural drivers pertaining to understanding of colour, we for a fact know that there are descriptive insights into how colou r means differently across cultures and yet there is a severe lack of theoretical integration. Future researchers should aim to develop interdisciplinary frameworks combining elements from cognitive to cultural psychology, Semiotics and anthropology, behavioural economics and consumer behaviour, In this era of globalisation and digital exposure there is an ever evolving understanding of colour,which could lead to a convergence or hybridisation of traditional colour associations

5.3 Digital Color Perception

One of the most under researched dimensions in marketing and cognitive science is the colour perception in digital environments. with the increasing digitalisation of consumer experiences from online shopping and social media to mobile apps and digital billboards , It is imperative to understand the role of visual branding and user engagement, There is hardly any studies on understanding the exposure to a backlit, screen displayed colour influencing perceptions, memory encoding and any emotional responses compared to a traditional print media. Digital colour unlike print media colour is distinctively different

since the colour is reflected under ambient light, digital display emits light directly and therefore creates visual experiences that are often more vibrant or saturated. Not only is the colour brightness and contrast perception better but it may also influence attention span, emotional arousal and primarily retention. For instance: a colour that evokes calmness in print may appear more stimulating on the screen potentially leading to a misrepresentation of a brand tone or a message, this leads to mistrust and confusion.

Color fidelity varies widely across different digital devices due to differences in screen resolution, brightness settings, calibration, and ambient lighting. As a result brand Colors may appear inconsistent across various consumer touch points. From Recognising brands physically to brands digitally marketers must account for the unique dynamics of how a digital colour is perceived, Adaptive design systems and colour palettes should be optimised for both light and dark mode,brand Colors across devices should be web safe. Digital Hues that perform better under screen luminance without compromising quality and brand equity should be leveraged.Contrast ratios should be inclusive across various vision types. For example brands such as Spotify have embraced a more colour responsive design system which allows their brand Colors to adapt dynamically across platforms while still preserving recognisability and have an aesthetic coherence.

There is a notable gap in the empirical literature on addressing how digital media halters the psychological processing of colour, Further studies such as backlit versus ambient lit colour environments affecting emotional valence, cognitive blood and consumer decision-making, Neuroscientific basis of screen based colour perception especially concerning working memory and attention modulation, Digital fatigue influencing consumer susceptibility to colour cues particularly useful in advertising and product design.

5.4 Longevity of Color Recall

Colors have always been known to capture our immediate attention and enhance our short-term memory as has been widely documented, Its long-term impact on brand loyalty and consumer recall has still been largely unexplored; most experimental designs today test color memory through immediate or short delay tasks However they overlook how consistent exposure to brand Colors can foster deep memory and coding and affective brand connections over time, This is a significant gap and a research area for strategic branding and consumer psychology.

Based on the dual coding theory and the levels of processing fame work discussed earlier we know that there are rich repeated sensory inputs which can lead us to a more durable memory traces, hence the importance of the colors effect on our memory is critical , color consistency over time is one such factor which can help brands gain stability and recognition over time and when used repetitively across platforms are able to trigger our memory and impact brand recalls, color based cues etc impact on the overall brand equity , brands such as coca-cola has been consistently known to use the color Red over decades to help establish its identity across regions and countries.

There is now a clear need for longitudinal experimental designs that can assess how brand colors can expose frequency and context which in turn affects long term retention, we would also require to understand the impact of the durability of color-emotion associations across various life stages of a consumer , increase use of technology in eye-tracking, implicit association testing(IAT) and neuroimaging could throw more light on how brands can evoke recall over colors .

PROPOSED THEORETICAL FRAMEWORK

This paper proposes a unified model that integrates:

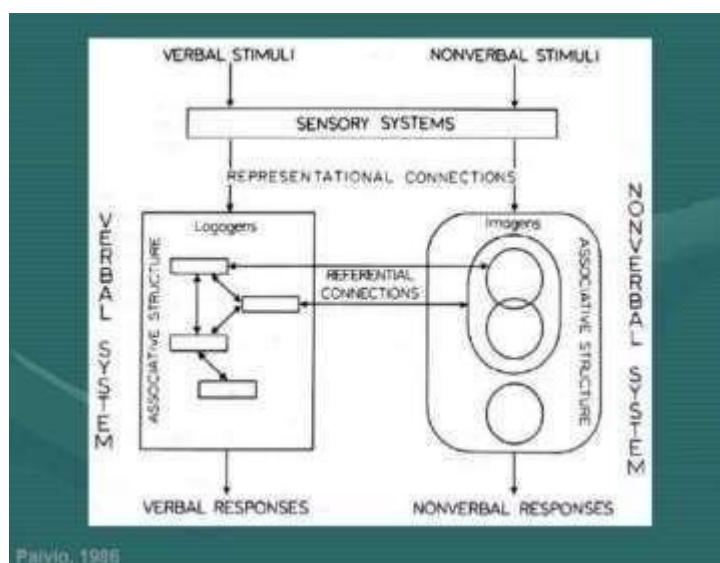● **Dual-Coding Theory** for encoding visuals and verbal stimuli

Image1: Source (Gilbert, 2010, #)

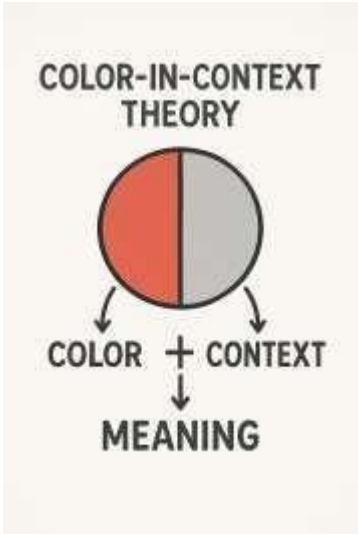● **Color-in-Context Theory** for interpreting emotional meaning

Image 2: Generated by the author using Sora by OpenAI, 2025

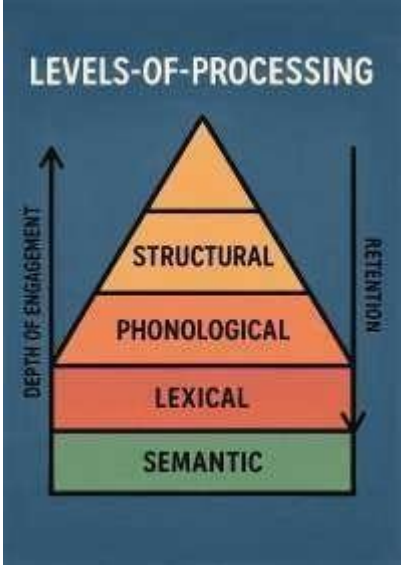- **Levels-of-Processing** for depth of engagement and retention

Image 3: Generated by the author using Sora by OpenAI, 2025

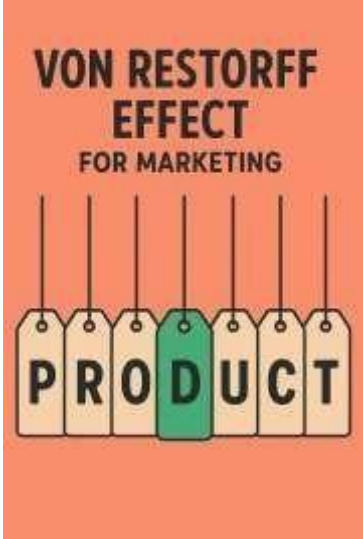- **Von Restorff Effect** for attention and salience

Image 4: Generated by the author using Sora by OpenAI, 2025

This model can guide future empirical research and assist practitioners in designing color-based strategies.

CONCLUSION

Color in marketing means a pretty picture is a thing of the past, it is a powerful tool now that shapes how we think, feel and remember . This paper shows to us how colors can subtly and overtly sway consumer behavior and plays a powerful cognitive and psychological catalyst, while there has been enough research on how we recall brands and remember things , we still have not been able to arrive at a single unified theory explaining how it all worlds, the findings in this paper affirm that colors can influence consumer behavior and they affect not just the conscious but also the subconscious levels, even though there are several empirical evidences validating color's effects on memory retentions and brand recall, a coherent theoretical synthesis remain underdeveloped, by bringing together ideas from Dual-Coding Theory, Picture Superiority Effect, and Color-in-Context Theory—with marketing insights we are now able to highlight how color impacts our minds as consumersAs digital media spaces grow and markets become global and diverse , futures research should address gaps related to cultural variability, long term effects of seeing the same colors etc , we need to develop a unified theoretical framework that blends neuroscience , psychology , and marketing which will not only enhance academic discourse but also help marketers with data backed tools so that they can craf t more compelling and emotionally resonant branding strategies

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