



**THE IMPACT OF PACKAGING COLORS
ON PURCHASE INTENTIONS:
CASE OF TÜRKİYE AND KAZAKHSTAN
MASTER'S THESIS**

Yuliya KIM

Eskişehir 2025

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MASTER'S THESIS

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FINAL APPROVAL FOR THESIS

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ÖZET

AMBALAJ RENKLERİNİN SATIN ALMA NİYETLERİ ÜZERİNDEKİ ETKİSİ: TÜRKİYE VE KAZAKİSTAN ÖRNEĞİ

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Davranışsal iktisat, son birkaç yıl içinde iktisadi düşüncenin en önemli gelişmelerinden biri olarak öne çıkmıştır. Geleneksel iktisat modelleri insanların her zaman rasyonel kararlar verdiğini varsayarken, davranışsal iktisat, insan tercihlerinin çoğu zaman bilişsel önyargılar, duygular ve zihinsel kısayollar tarafından etkilendiğini kabul eder. Bu çalışma, ambalaj renginin tüketici satın alma kararlarını nasıl etkilediğini incelemektedir. Aynı ürünlerin farklı renk düzenlerinde sunulması yoluyla, rengin yalnızca bir çerçeveleme aracı değil, aynı zamanda davranışsal bir yönlendirme işlevi gördüğü gösterilmiştir. Ayrıca, kültürel ve kuşaklar arası farklılıkların tüketici algısını davranışsal iktisadın temel ilkeleri çerçevesinde nasıl şekillendirdiği ortaya konmuştur. Çalışma, sıcak renklerin genellikle haz odaklı ve dürtüsel tercihlerle (vice) ilişkilendirilmesine; soğuk renklerin ise özdenetim ve sağlıklı tercihlerle (virtue) bağlantılı olmasına odaklanmaktadır. Bu renklerin, tüketicilerin ambalajlara ve pazarlamaya nasıl tepki verdiklerini etkilediği araştırılmıştır. Deneysel bir yöntem kullanılarak, farklı yaş, gelir ve eğitim düzeylerine sahip kişilerden Türkiye ve Kazakistan'da anket yoluyla veri toplanmıştır.

Anahtar Kelimeler: davranışsal iktisat, tüketici davranışı, ambalaj rengi, bilişsel önyargı, yönlendirme, karar verme, kültürlerarası çalışma, deney, Türkiye, Kazakistan

ABSTRACT

THE IMPACT OF PACKAGING COLORS ON PURCHASE INTENTIONS: CASE OF TÜRKİYE AND KAZAKHSTAN

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Anadolu University, Graduate School of Social Sciences, June, 2025

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Behavioral economics has emerged as one of the most significant advancements in economic thought over the past few decades. Unlike traditional economic models that assume people always make rational decisions, behavioral economics recognizes that human choices are often influenced by cognitive biases, emotions, and mental shortcuts. This study examines how packaging color affects consumer purchasing decisions, by presenting the same products in different color schemes, showing how color acts not only as a framing device but also as a behavioral nudge, revealing how cultural and generational differences shape consumer perception through key principles of behavioral economics. It focuses on how warm colors are often linked to indulgence and impulsive choices, known as vice, and cool colors, usually connected to self-control and healthier options, known as virtue, influence how consumers respond to packaging and marketing. Using an experimental method, data was collected through surveys from people of various ages, income levels, and educational backgrounds in both Türkiye and Kazakhstan.

Keywords: behavioral economics, consumer behavior, packaging color, cognitive bias, nudging, decision-making, cross-cultural study, experiment, Türkiye, Kazakhstan

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SYMBOLS AND ABBREVIATIONS

2AFC : Two-Alternative Forced Choice Procedure

ANOVA : Analysis of Variance

BE : Behavioral Economics

DLPFC : Dorsolateral Prefrontal Cortex

ET scan: : Eye Tracking Scan

fMRI : Functional Magnetic Resonance Imaging

HSB : Hue, Saturation, Brightness

LIP : Lateral Intraparietal Cortex

MRI : Magnetic Resonance Imaging

OFC : Orbitofrontal Cortex

PET : Positron Emission Tomography

P-value : Probability Value

PS-test : Paired Samples T-Test

SOR : Stimulus-Organism-Response

INTRODUCTION

Consumer behavior is a dynamic and multifaceted field that integrates insights into psychology, sociology, and economics to understand how individuals make purchasing decisions. While traditional economic models often assume rational decision-making, modern research highlights the significant role of subconscious factors, such as emotions, cognitive biases, and sensory cues, in shaping consumer choices. Among these factors, the role of color in product packaging has emerged as a critical yet often underestimated element in marketing strategies. (Kadıhasanoğlu, 2007)

Color is one of the first sensory cues consumers encounter when interacting with a product. It serves as a powerful visual stimulus that can evoke emotions, convey brand identity, and influence perceptions of quality and value. Research indicates that consumers form initial impressions of a product within 90 seconds, and up to 90% of these impressions are based on color alone (Singh et al., 2006). Given the rapidity of these judgments, the strategic use of color in packaging can significantly impact purchasing behavior.

From a theoretical perspective, the impact of color on consumer behavior can be explained through multiple psychological and economic frameworks. Color psychology suggests that different hues evoke specific emotional and cognitive responses, affecting how consumers evaluate products (Kaya & Epps, 2004). Meanwhile, behavioral economics provides insights into how subconscious biases influence purchasing decisions, emphasizing concepts such as heuristics, nudging, and the framing effect (Kahneman & Tversky, 1979). The dual-process theory (Evans, 2008) further supports this notion by suggesting that human decision-making operates on both intuitive and analytical levels, with color often engaging the faster, subconscious processing system.

Recent studies have reinforced the importance of color in marketing strategies. For example, a study by Reinecke et al. (2018) found that color contrast and saturation levels significantly impact consumer engagement with digital advertisements, suggesting that similar principles apply to physical product packaging. Likewise, a meta-analysis by Mehta and Zhu (2020) confirmed that red enhances arousal and urgency in consumers,

increasing the likelihood of impulse purchases, whereas blue fosters a sense of trust and dependability, making it a preferred choice for financial services and healthcare products.

Previous studies have consistently demonstrated a correlation between packaging color and consumer preferences. Research by Labrecque and Milne (2012) found that warm colors such as red and orange create a sense of urgency and excitement, often leading to impulsive purchases. In contrast, cool colors like blue and green are associated with trust and reliability, making them more effective for brands aiming to establish long-term customer relationships. Additional studies indicate that color influences taste perception and perceived product quality. For instance, a study by Spence et al. (2015) showed that beverages in red packaging were perceived as sweeter than the same beverages in blue packaging, despite no actual difference in composition.

A study by Pantin-Sohier et al. (2021) further explored the impact of color on consumer perception, revealing that consumers associate black packaging with premium, high-quality products, while white packaging is perceived as simple and clean. This aligns with findings by Sundar and Noseworthy (2019), who demonstrated that luxury brands frequently utilize darker, richer tones in packaging to enhance perceptions of exclusivity and prestige.

These results align with previous research, such as the work of Huang and Lu (2022), which found that cultural backgrounds significantly shape color associations in consumer preferences. Their study emphasized that while Western consumers tend to favor minimalistic packaging, consumers from collectivist cultures, such as those in Central Asia, show a preference for more colorful and detailed packaging designs that reflect cultural heritage.

This thesis investigates how packaging color influences consumer perception and purchase intention, particularly through the lens of behavioral economics and cross-cultural psychology. Drawing on established theories such as framing, perceived fluency, and aesthetic congruence, the research explores how the same product can be interpreted differently based solely on changes in its color scheme. A key focus is placed on the distinction between vice products (indulgent and pleasure driven) and virtue products (healthy and beneficial). Prior literature suggests that warm-toned colors (such as red or

yellow) are more effective in enhancing the appeal of vice products, while cool-toned colors (like green or blue) tend to reinforce perceptions of healthiness and trustworthiness in virtue products. By testing these dynamics across different generational and cultural groups of Türkiye and Kazakhstan, this study aims to uncover how visual cues like color function as behavioral nudges, subtly guiding consumer behavior in diverse market settings.

This thesis is structured as follows: Chapter One introduces the theoretical foundations of color psychology and behavioral economics, providing a comprehensive background on how these factors influence purchasing decisions by exploring the role of color in marketing. Chapter Two examines the psychological and emotional effects of color, focusing on its impact on brand perception and consumer trust, including generational differences in color preferences. Chapter Three outlines the research methodology, detailing the questionnaire design, data collection process, and statistical analysis techniques. The Conclusion presents the findings of the study, offering a comparative analysis of consumer preferences in Türkiye and Kazakhstan, discusses the implications of these findings for marketers, policymakers, and businesses, highlighting future research directions and potential applications of color-based marketing strategies.

CHAPTER 1. COLOR AND CONSUMER BEHAVIOR: A THEORETICAL FRAMEWORK

The primary objective of Chapter One is to establish theoretical foundation for the study by exploring the role of color in consumer behavior through psychological and behavioral economic perspectives. This chapter synthesizes previous research, contemporary findings, and theoretical models to highlight how packaging color influences purchasing decisions. By examining the intersection of color psychology and consumer decision-making, the chapter provides a framework for understanding why and how packaging color affects consumer preferences. Each subsection in this chapter focuses on a distinct aspect of the theoretical background: Section 1 explores the foundational role of color in marketing, emphasizing how it shapes brand identity, influences consumer perception, and supports core marketing functions such as product positioning and differentiation. It also introduces the basics of color theory, the psychological science behind color, and how these concepts intersect with consumer behavior and decision-making. Section 2 analyzes the principles of behavioral economics, examining how cognitive biases and heuristics—such as the framing effect, anchoring, and loss aversion—influence perceived value and consumer trust through these cognitive mechanisms. Section 3 focuses on cognitive biases, heuristics, and subconscious factors—such as the contrast effect and procedure invariance—and their role in consumer responses to packaging colors. It analyzes how marketers apply these insights to guide consumer decision-making. Section 4 examines the role of cultural backgrounds in shaping consumer responses to packaging colors, providing a comparative analysis of consumer behavior in Türkiye and Kazakhstan. This section also integrates insights from neuroeconomics, highlighting how brain functions, such as reward systems and emotional processing, contribute to color-based decision-making across cultural contexts.

1.1 The Role of Color in Marketing

Color is a fundamental element of visual communication and plays a pivotal role in marketing. It is not merely an aesthetic choice, but a strategic tool that can influence consumer behavior at both conscious and subconscious levels. The psychological and emotional effects of color have been extensively studied, with researchers identifying specific associations between colors and consumer responses. Research reveals that nearly 90% of initial judgments about products rely on color. The right color choice can instantly capture attention and evoke a positive first impression, making it an essential consideration for brands.

Additionally, the term "marketing" originates from the Latin root "*marcatus*," meaning "market," and "*marcari*," meaning "store." Over time, the concept has evolved into more than just selling; marketing is now a social and administrative process aimed at fulfilling the needs and desires of consumers through the exchange of value. In modern terms, marketing serves as a vital mechanism for meeting consumer needs. Broadly defined, it is both a social and administrative process through which groups and individuals fulfill their needs and desires by producing, exchanging, and sharing valuable products or services. Within the context of a more competitive business environment, marketing focuses on fostering mutually beneficial value exchanges between businesses and consumers, ensuring long-term profitability and satisfaction on both sides.

1.1.1 Psychological and Emotional Effects of Color

The psychological influence of color is rooted in its ability to evoke emotions and influence mood. For instance, warm colors such as red, yellow, and orange are frequently associated with energy, excitement, and urgency. They are commonly used in marketing to stimulate impulse purchases or draw attention to promotional offers. In contrast, cool colors like blue, purple and green are linked to feelings of calmness, trust, and reliability, making them suitable for brands that want to convey stability and professionalism (Labrecque et al., 2012). Each color carries unique emotional connotations that brands can harness to connect with their target audience. For instance, red often evokes passion and excitement, making it a favorite for energy drinks and entertainment. Blue conveys

trust and reliability, which is why it is commonly used by financial institutions and healthcare companies.

Emotional product design focuses on creating products and environments that evoke affection and desirability, fostering happiness and a strong desire for ownership. This approach aims to craft positive and memorable user experiences, enabling individuals to take pride in their association with the product, deepening their loyalty, and sparking greater interest and admiration from others.

1.1.2 Color and Brand Identity

Color is a vital component of brand identity and plays a crucial role in brand recognition. Colors can become synonymous with a specific brand, creating a strong visual identity that helps with brand recognition and memorability. Consistent use of color in packaging and branding helps establish a strong visual identity that consumers can easily recognize. Colors can become synonymous with a specific brand, creating a strong visual identity that helps with brand recognition and memorability. To give an example, the legendary red and white color combination of Coca-Cola is immediately recognizable worldwide, reinforcing the brand's identity and creating a sense of closeness and trust for consumers. Tiffany & Co.'s blue, or McDonald's yellow – these colors instantly bring those brands to mind. Moreover, colors can be used as a Call to action, they can be used to influence behavior and encourage conversions. Green is often associated with "go" and is frequently used for call-to-action buttons. Black can convey luxury and exclusivity, making it effective for high-end products.

1.1.3 Colors as Marketing Strategy

When Apple introduced the redesigned iPod Shuffle in October 2006, it was initially available only in silver. However, within three months, Apple expanded the range to include orange, blue, purple, and green, promoting the new palette with the slogan "Put some color on." One of the key appeals of these colorful Shuffles was that customers could choose a device color that matched their personal style and wardrobe.

Recognizing the growing trend of technology becoming a fashion statement, Sony followed suit by launching its Vaio collection in India. This collection featured a variety

of colorful computers, cameras, and MP3 players, capitalizing on consumer desire for personalized and stylish electronics.

In marketing, the initial step in influencing consumer perception is to capture attention. According to Goodgold (2010), color plays a crucial role in this process, as consumers subconsciously register color within the first three seconds of exposure. Effective use of visual branding, particularly through color, can shift how a brand is perceived, modify its image, and even provoke physical reactions rather than purely emotional ones.

Madden, Hewett, and Roth (2000) highlighted a case in which the Wagner Color Research Institute identified that the color orange conveyed a sense of affordability. Acting on this insight, Weinerschnitzel, a fast-food chain, incorporated orange into its visual branding to signify that it offered low-cost hot dogs. The outcome was notable—a 7% rise in sales—demonstrating the potential of color alone to effectively communicate brand messaging.

One of the most significant corporate investments in color branding was seen in the rivalry between Pepsi and Coca-Cola. In 1996, Pepsi introduced “Project Blue,” a \$500 million global rebranding campaign that aimed to distinguish the brand through a vibrant “electric blue” shade, contrasting Coca-Cola’s iconic red (Tavassoli, 2001). As part of the initiative, Pepsi even went as far as repainting an Air France Concorde jet, as reported by LaBrecque and Milne (2011). This shift away from a traditional color scheme was a strategic move to build fresh color associations and reposition the brand in the marketplace (Aslam, 2006).

Similarly, Owens Corning, a manufacturer of fiberglass insulation, launched a decade-long “Get Pink” campaign that cost over \$42 million. By consistently using the color pink in its branding, the company successfully differentiated its products from competitors who traditionally used yellow insulation. The campaign significantly strengthened consumer association of the color pink with Owens Corning (Zaichkowsky, 2010).

These examples show how companies have strategically leveraged color not only to reshape brand identity but also to drive purchasing behavior. As LaBrecque and Milne (2011) noted, distinctive color use can help a brand forge strong connections with target

consumers and achieve a clear market position. Additionally, studies suggest that warm hues—such as yellow, red, and orange—tend to be more visually engaging and can attract foot traffic, while cool tones like green and blue are viewed as calming and are often preferred in retail environments where thoughtful purchasing decisions are made (Aslam, 2006).

The increasing consumer preference for color is evident across multiple product categories, reinforcing the idea that color is a powerful marketing tool. Research from the International Association of Designers and the Color Marketing Group (CMG) suggests that color can increase brand recognition by up to 80%, attract 42% more attention than black-and-white advertisements, and influence up to 85% of consumer purchasing decisions. CMG President Jack Brennander emphasizes that forward-thinking companies understand the value of customization through color, noting that products today are more than just functional items—they serve as an extension of personal expression. (Nawar et al., 2024)

1.2 Fundamentals of Marketing and Consumer Behavior

Establishing Objectives: Marketing contributes to setting overall project objectives and defining specific marketing goals for each business unit. This is especially important for organizations with diverse product mixes or multiple business segments. (Weld, 1917)

Identifying Strengths and Weaknesses: It plays a role in assessing the organization's internal strengths and weaknesses, while also spotting external marketing opportunities and potential challenges or threats that require resolution or avoidance. (Ballantyne, 2000)

Conducting Research: Marketing involves designing and implementing field studies focused on consumers, competitors, and industry trends. These studies help provide valuable insights to guide decision-making. (Oldman, 1977)

Data Analysis: By analyzing and interpreting data collected through research and information systems, marketing teams present actionable insights and results that inform strategic decisions. (Baška et al., 2019)

Optimizing the Marketing Mix: This includes adjusting the marketing mix of underperforming products, discontinuing unsuccessful offerings, and presenting fresh products to satisfy growing consumer needs, preferences, and tastes. (Huang et al., 2024)

Defining Brand Strategies: Marketing oversees policies related to branding, services, and guarantees offered alongside products. This also includes decisions about packaging, such as size, color, and design. (Durmaz & Vildan, 2016)

Competitive Analysis: It involves studying competitors' strategies, identifying opportunities for improvement, and developing effective methods to stay ahead in the market. (Sarvary & Parker, 1997)

Evaluating Distribution Channels: Marketing assesses the effectiveness and profitability of distribution outlets and identifies the most suitable channels that align with both organizational goals and consumer interests. (Chen et al., 2014)

Designing Promotional Campaigns: It determines the objectives, tools, timing, content, and structure of promotional activities for products and services. These campaigns are tailored to target markets and designed to maximize impact. (Sodoma et al., 2023)

1.2.1 Functions and Importance of Marketing

Marketing holds immense significance, extending far beyond merely delivering goods or services to end consumers or industrial sectors. Its importance encompasses a broad range of activities and impacts, including:

Enhancing Product Value: Marketing informs production and design teams about consumer needs and preferences, ensuring that aspects like product design, quality, and packaging align with their expectations. (Ofek & Srinivasan, 2002)

Competing Locally and Globally: It helps businesses stand up to competition from foreign or multinational companies within local markets, safeguarding their market share.

Expanding Internationally: Marketing identifies opportunities in global markets, enabling businesses to enter these markets directly through foreign direct investment or indirectly via exports and licensing agreements. (Shankar & Meyer, 2009)

Generating Employment: By driving activities such as sales, advertising, market development, and research, marketing creates diverse employment opportunities across different sectors. (Schweitzer & Lyons, 2008)

Stimulating Consumer Demand: It identifies prospective customers' needs and preferences, helping convert passive demand into active engagement.

Influencing Consumer Behavior: Marketing strategies are designed to encourage, motivate, or persuade consumers to adopt specific goods or services that fulfill their needs.

Shaping Demand Positively: Marketing efforts guide individual attitudes and behaviors, fostering new and constructive demand patterns. (Romeh et al., 2024)

1.2.2 Components of the Marketing Process

Needs: These represent a sense of imbalance or inadequacy, such as the need for food, clothing, or shelter. Marketing aims to identify these needs or stimulate awareness of them in individuals.

Desires: Desires are the specific ways individuals choose to fulfill their needs, shaped by personal preferences and their environment. For example, while someone may need food, their desire might be directed toward eating pizza.

Demand: Demand arises when a desire is accompanied by purchasing power. Without the financial ability to support it, a desire remains merely a wish.

Products: Products refer to the goods, services, or ideas that meet individual desires and needs, delivering the benefits or solutions consumers are seeking.

Exchange: The marketing process relies on an exchange, where both parties offer value to each other. For instance, the consumer provides money in return for a product or service.

Markets: A market consists of current and potential consumers who both have the desire for a product and the financial capability to purchase it. (Sanchez, 1999)

1.3 Introduction to Color Science

Color is an integral part of our surroundings, present in every aspect of our lives and the world around us. As expressed in the words of God Almighty in Surat Al-Nahl, verse 13: " And He has disposed for you whatever He has created for you in the earth of animals plants and otherwise diverse in hue such as red yellow green and otherwise. Surely in that there is a sign for people who remember a people who are admonished." This verse reflects the interpretation of physiological and psychological states, closely tied to the complexities of the human soul and its emotions—ranging from love and hatred to satisfaction and tranquility. Due to its significance, color often carries symbolic meanings and connotations, emphasizing its importance in visual communication. It plays an essential role in enhancing perception, catching attention, and fostering an emotional connection.

Scientifically, color can be defined as radioactive energy with varying wavelengths and frequencies that transition from one color to another. This energy is processed by photoreceptors in the retina, which interpret it as colors. The retina contains three types of cone cells: the first type is most sensitive to longer wavelengths, allowing us to perceive red; the second type responds to medium wavelengths and enables the perception of green; and the third type is more sensitive to shorter wavelengths, creating the sensation of blue. (Nicola & Nicola, 2002)

1.3.1 The Color Wheel and Historical Perspectives

The color wheel represents the culmination of centuries of exploration in color theory, art, and science, with its origins stretching back to the 13th century. Early references, such as Aristotle's linear color scale and Robert Grosseteste's concepts of color geometry, laid the foundation for circular color systems. Sir Isaac Newton's 1704 publication of the seven-color spectrum revolutionized the concept, combining physical properties of light with perceptual experiences, and introduced complementary colors. Alternative systems, like those of Johann Wolfgang von Goethe and Moses Harris, emphasized psychological primaries and subtractive color mixing for practical artistic purposes. The 19th and 20th centuries saw significant scientific advancements, with figures like Hermann von Helmholtz and Ewald Hering using the color wheel to study human vision and perception,

while Albert Munsell created a three-dimensional model for precise applications in industries. Josef Albers' mid-20th-century studies highlighted color interactions, underscoring the dynamic relationships visualized in the color wheel. Modern research, such as Jonauskaite et al.'s 2018 study, explores the psychological effects of colors, demonstrating systematic associations between mood and color choices. The evolution of the color wheel reflects a rich interplay between artistic expression and scientific inquiry, cementing its significance as a tool for understanding and utilizing color relationships.

1.3.2 The Concept of Color

Color is a remarkable phenomenon that encompasses everything around us, serving as a tool to reveal and distinguish the identity of objects more clearly. Everything, whether living or inanimate, is defined by color, which showcases the creativity and unparalleled design of God as the Creator of all things.

Colors profoundly influence the human psyche, they have psychological effects, impacting emotions and mental states, and physiological effects, influencing the body. Every color involuntarily affects the human psyche, to the extent that colors are even used therapeutically in addressing certain psychological conditions.

Colors are an integral part of our daily lives, present in our homes, clothing, streets, vehicles, media, and entertainment. This vibrant and universal language facilitates human connection. As noted, color is both a language and a feeling shared by all humanity; whether someone is from the east or the west of the globe, their emotional response to colors remains universally similar.

1.3.3 Color Characteristics and Their Psychological Effects

Colors are a fundamental component of product design, playing a critical role in enhancing the overall aesthetic appeal. They are among the most effective tools used to convey specific messages to consumers. Marketers and brand managers strategically use colors to capture attention, attract new customers, and make products easily recognizable.

Beyond aesthetics, colors also evoke emotional responses, create associations, and establish brand identity. For instance, specific colors can communicate qualities like luxury, trust, or energy, influencing how consumers perceive a product or brand. A well-chosen color scheme not only sets a product apart from competitors but also helps foster loyalty and positive emotional connections with customers. (Jin et al., 2019)

Cold Colors: Shades like violet, blue, and blue-green are known for evoking feelings of tranquility, calmness, and confidence. While they often symbolize peace, they can also evoke sensations of sadness or detachment. (Choi et al., 2016)

Warm Colors: These include hues ranging from purple and green on one end to red and yellow on the other. They often convey warmth, comfort, and passion but can also be associated with anger and hostility. (Gao & Xin, 2006)

Positive Colors: Red, orange, yellow, infrared, and black are examples of positive colors. They are characterized by their energizing and stimulating properties, often creating a sense of excitement and vitality.

Negative Colors: Blue, indigo, violet, ultraviolet, white, and green fall into this category. These colors are associated with calming and soothing effects, but their strong reactions can also create a sensation of coolness or detachment.

Color can be identified based on specific characteristics or values, allowing us to differentiate between various colors. These include:

Hue: This refers to the attribute by which we recognize and distinguish one color from another, such as blue, green, or red. When two hues mix, such as red and yellow, they create a new hue like orange, representing a shift in the color's characteristic.

Value: This pertains to a color's brightness or darkness, such as light green or dark green, and it varies depending on how much lightness or opacity the color exhibits.

Saturation: This indicates the intensity or purity of a color, defined by how vibrant it appears, which depends on its level of mixing with black or white. A more saturated color appears vivid, while lower saturation results in a muted or pale tone. (Wilms & Oberfeld, 2018)

The psychological effects of colors are profound and diverse. Red, often symbolic of blood, represents vitality and energy. It stimulates circulation, combats lethargy, and promotes activity. However, due to its high vibrations, it can disrupt relaxation and cause insomnia or nightmares, making it unsuitable for restful spaces. Yellow symbolizes intellect, imagination, and mental activation, promoting creativity and clearing the mind, especially under mental stress or tension. Blue, a calming color, encourages relaxation and stability, offering psychological and emotional balance. It also conveys transcendence, depth, and hope, inspired by the sky and water. Orange invigorates the heart, combats depression and lethargy, and uplifts mood. Green, associated with harmony and balance, is soothing for both body and mind, providing a calming effect even during pain or distress. White symbolizes purity, clarity, and tranquility, inspiring serenity and optimism, though it can evoke negative emotions in those who associate it with hospital environments. Black, the absence of color, conveys strength, confidence, and elegance, widely celebrated in fashion, yet it can suppress appetite and evoke somber feelings. Lastly, gray, especially medium tones, is neutral and mysterious, often symbolizing elegance and sophistication despite its lack of expression. Each color's psychological impact is nuanced, influenced by cultural and personal experiences. (Singh & Srivastava, 2011)

1.4 Behavioral Economics and Consumer Decision-Making

The study of consumer behavior forms a specific aspect or an integral component of understanding overall human behavior. It focuses on the activities and actions undertaken by consumers that are directly linked to meeting their needs and desires, ultimately shaping the consumption process. Behavioral economics challenges the traditional assumption of rational decision-making by highlighting the role of cognitive biases, heuristics, and emotions in shaping consumer behavior. These principles provide valuable insights into how packaging color influences purchasing decisions.

From this standpoint, consumer behavior can be described as "the collection of actions performed by individuals in relation to the purchase and utilization of goods and services, which also encompasses the decision-making process that precedes and influences these

actions. This understanding enables marketers to develop strategies aimed at influencing consumer behavior effectively."

1.4.1 Key Concepts in Behavioral Economics

Behavioral economics largely emerged from studying deviations from traditional rational-choice principles. These deviations are not just exceptions but offer insights into developing broader or alternative theories that can encompass rational choice as a special case. This expanded framework allows researchers to empirically examine the conditions under which rational choice holds and measure the benefits of extending the theory.

One foundational concept in rational-choice theory is the assumption of complete preferences, where individuals can rank options consistently. However, behavioral research suggests that preferences are often influenced by how choices are framed and by reference points derived from expectations (Koszegi & Rabin, in press). This reference-dependence implies that external factors, such as marketing strategies and pricing, can shape consumer preferences. For instance, the way choices are described can alter decisions by drawing attention to specific attributes, challenging the notion of stable preferences.

Another key deviation from rational-choice theory involves procedure invariance, which assumes that preferences remain consistent across different elicitation methods. Slovic and Lichtenstein (1968) demonstrated that people's choices between gambles can reverse depending on whether they are asked to choose or assign a price, indicating that the context of decision-making influences outcomes. This finding has practical applications, as different auction formats and pricing mechanisms can be used to influence consumer behavior.

1.4.1.1 The Framing Effect

The framing effect refers to the phenomenon where the presentation of information influences decision-making. In the context of packaging, color acts as a framing mechanism that shapes consumer perceptions of a product. For example, products with brightly colored packaging are often perceived as fun, energetic, and affordable, while

muted or monochromatic packaging conveys sophistication and premium quality (Tversky et al., 1981).

1.4.1.2. Anchoring Effect on Pricing and Perception

The anchoring effect occurs when individuals rely too heavily on an initial piece of information (the "anchor") when making decisions. In retail, anchoring is often used in pricing strategies, but it also applies to packaging design. For example, consumers may associate dark, matte packaging with luxury and high-end products, leading them to perceive the product as more valuable regardless of its actual quality (Ariely et al., 2008).

1.4.1.3. Loss Aversion and Packaging Design

Loss aversion, a concept introduced by Kahneman and Tversky (1979), refers to the tendency for people to prefer avoiding losses over acquiring gains. Marketers leverage this principle by designing packaging that emphasizes scarcity or exclusivity. For example, limited-edition packaging or labels that highlight low stock levels (e.g., "Only 3 left in stock!") create a sense of urgency and tap into consumers' fear of missing out (Thaler et al., 2008).

1.4.1.4. Nudging

In the influential work Nudge (2008), it's stated that human preferences are often inconsistent and shaped by cognitive limitations, making some form of paternalism unavoidable. The goal is to gently steer people in directions they would likely choose for themselves if they were not affected by common cognitive biases. (Thaler & Sunstein, 2008). Over time, nudging has become a widely used tool in both academic research and practical applications. Researchers often begin with a real-world behavioral issue—such as low attendance at dental check-ups—and then design subtle interventions to address it. For instance, patients were sent reminder letters, with some receiving emotionally framed messages (e.g., including a happy or sad face), while others received neutral messages. Comparing the behavior of these groups allowed researchers to assess the effectiveness of different nudging strategies. (Altmann & Traxler, 2014)

1.4.2 New Trends in Behavioral Economics

Behavioral economics has recently begun incorporating broader psychological concepts beyond traditional decision research. One emerging focus is on the role of attention, which is considered a scarce cognitive resource. Research by Odean and Barber (2005) indicates that attention-grabbing events, such as unusual trading volumes or news, influence individual investor behavior. Additionally, Della Vigna and Pollett (2005) found that markets react less to earnings announcements made on Fridays, leading firms to release unfavorable news on these days. Falkinger (2005) further explores how companies strategically adjust their product signals to capture consumer attention.

Attribution theory examines how individuals infer causes from observed effects. Research suggests people tend to overattribute outcomes to personal actions rather than external factors (Weber et al., 2001). For example, Bertrand and Mullainathan (2001) found that oil company executives are rewarded when oil prices rise but face limited accountability when prices fall. Similarly, Einav and Yariv (2005) observed that economists listed first in author sequences—usually alphabetical—receive disproportionately more recognition.

Categorization, the mental process of grouping information, also influences decision-making. Mullainathan (2002) demonstrated that weak evidence can shift perceptions across categories, amplifying small influences. Fryer and Jackson (2004) developed a model of optimal categorization and applied it to explain labor market discrimination, highlighting how cognitive shortcuts affect economic behavior.

Neuroeconomics connects economic decision-making with neural mechanisms, leveraging advanced tools like PET scans, fMRI, and genetic testing. This interdisciplinary approach reveals how the brain's structure influences economic behavior. The brain consists of four interconnected lobes—frontal, parietal, occipital, and temporal—that facilitate specialized functions. Human brains share many structures with other species, and research on animal behavior provides insights into human decision-making. For instance, both rats and humans exhibit similar neural responses to addictive substances, indicating shared reward circuits.

Complex behaviors often become automatic due to the brain's limited executive functioning capacity, which is concentrated in the cingulate cortex. For example, novice drivers require significant cognitive resources to process visual cues and motor skills, but with practice, these actions become almost effortless.

The primary goal of neuroeconomics is to uncover the neural pathways underlying economic choices, enhancing the predictive power of economic models. In areas essential for survival, such as food and safety, neural circuits appear to approximate rational decision-making. Platt and Glimcher (1999) found that neurons in the monkey lateral intraparietal cortex (LIP) fire in direct correlation with expected rewards, while other studies show monkeys can learn to approximate mixed strategies in games using reinforcement mechanisms (Lee, McGreevy & Barraclough, 2005). Furthermore, researchers like Padoa-Schioppa and Assad (2005) have identified neurons that encode the value of different options.

Neural evidence also supports concepts from behavioral economics. For instance, McClure et al. (2004) identified two brain systems associated with time discounting, aligning with the quasi-hyperbolic model. Sanfey et al. (2003) discovered that low offers in ultimatum games activate emotional regions like the insula and areas involved in planning and conflict resolution, such as the dorsolateral prefrontal cortex (DLPFC) and anterior cingulate. This neural activity correlates with whether offers are accepted or rejected, supporting models that account for social preferences and fairness concerns.

Further, Hsu et al. (2005) distinguished neural responses to risk and ambiguity. Ambiguous decisions activate the orbitofrontal cortex (OFC) and the amygdala—regions involved in emotional processing and vigilance. Notably, individuals with damage to the OFC exhibit reduced ambiguity aversion, reinforcing the connection between neural activity and decision-making under uncertainty.

1.4.3 Behavioral Economics and Neuroeconomics

Integrating behavioral economics and neuroeconomics into mental health research offers valuable insights for understanding psychological disorders and developing more personalized treatments. Behavioral economics sheds light on how cognitive biases and

heuristics shape decision-making, often contributing to maladaptive behaviors observed in mental health conditions. Neuroeconomics extends this perspective by linking these behaviors to specific brain mechanisms, providing a more comprehensive understanding that merges both behavioral and biological viewpoints.

Advanced neuroimaging methods, such as functional MRI and PET scans, allow researchers to observe brain activity during decision-making processes, helping to identify how neural circuits differ in individuals with mental health conditions. Additionally, computational models can simulate decision-making behaviors, offering predictive insights and aiding in the development of targeted interventions. These approaches may also help in identifying biomarkers, facilitating earlier diagnosis and more precise treatment strategies. (Rubinsztein et al., 2001)

In conclusion, combining behavioral economics and neuroeconomics with mental health research holds significant promise for improving the understanding and treatment of psychological disorders. Advancing this field requires ongoing interdisciplinary collaboration, technological innovation, and strict ethical oversight to ensure the responsible and effective application of these cutting-edge approaches in mental health care (Abdullaeva et al., 2023).

1.5 Cross-Cultural Perspectives on Color Perception

Color preferences are shaped by both personal experiences and cultural backgrounds. As people grow, they start linking certain colors with emotions, memories, or traditions—some pleasant, others less so (Ogden, Akcay, & Sable, 2010). These associations tend to be subjective and individual. However, color also serves as a universal language in marketing, especially when building strong brand identities across global markets (Grimes & Doole, 1998). The way people interpret color isn't random—it's often deeply tied to their cultural values, religious beliefs, and even national identity (Cozier, 1996).

Although meanings vary between cultures, many color perceptions are consistent enough for marketers to rely on them. For example, certain colors become tied to national holidays: in the U.S., red, white, and blue symbolize the Fourth of July, while green

represents St. Patrick's Day (Speichert, 2005). Some color associations evolve over time, but others remain stable across generations and regions (Wagner, 1988; Grossman & Wisenblit, 1999). Recognizing both global trends and local differences is essential for effective branding (Madden et al., 2000; Sable & Akcay, 2010).

Cultural context plays a significant role in shaping color associations and preferences. Colors that are perceived positively in one culture may have negative connotations in another. Understanding these differences is crucial for multinational brands aiming to market their products effectively across diverse regions. Consumer color perception is influenced by demographic factors such as age, gender, and education, although not consistently across all cases. For marketers to stay competitive, it is crucial to analyze color schemes and identify the specific demographic profile of their target audience. This insight helps determine which colors are most effective for branding and product presentation. Findings also suggest that color perception can influence purchasing decisions, making it essential to use color strategically to differentiate products, strengthen brand loyalty, enhance competitiveness, and boost sales. In the context of food, packaging color can even suggest taste and product characteristics. Furthermore, consumer reactions to color vary across industries like food, services, technology, and finance. Given these nuances, further research is needed to understand how color influences consumer behavior across different product categories. (Sliburyte & Skeryte, 2014)

1.5.1 Cultural Differences in Color Associations

Here's a brief summary of common color associations across various cultures and contexts:

Red is linked to energy, passion, appetite, and urgency. It's culturally powerful in China and India and often used in restaurants and packaging (pcimag.com, 2002; Paul, 2002; Schmitt & Simonson, 1997).

Blue symbolizes trust, calm, and stability. It is the most preferred color in the U.S., widely used in corporate branding, and carries different meanings in Eastern cultures (Wagner, 1988; Schmitt & Simonson, 1997; Jacobs et al., 1991). Moreover, blue is associated with

immortality in such countries as China; it is also Krishna's color in Hinduism, symbolizing holy spirits for Jewish and is a color of protection in the Middle East.

Black conveys sophistication and authority but can also be associated with mourning, death, evil, or mystery (Wagner, 1988; Paul, 2002; Nicholson, 2002), as well as being considered sophisticated and elegant (pcimag.com, 2002). The majority of government offices around the world use black cars and transportation vehicles.

White represents purity and peace in many Western contexts but can symbolize death in Asian cultures (Nicholson, 2002; Paul, 2002). Nicholson, 2002 writes that it represents purity, simplicity, cleanliness, reverence, peace, sophistication and joy. On the other hand, white represents death and mourning in Japan and on the other hand, sterility and coldness in Eastern Countries.

Purple suggests luxury, creativity, and spirituality. Its reception varies globally—from being exotic and regal in some cultures to affordable in others (Paul, 2002; Jacobs et al., 1991; Nicholson, 2002). In the past, purple dye was being obtained from the mucous glands of snails. It would require thousands of snails to yield a single gram of dye, making it a color only wealthy could purchase. Nowadays, purple is a current trend that is favored by creative individuals. In South Korea and China, purple is seen as costly but viewed as not so expensive in the States. (Jacobs et al. 1991).

Green is calming and strongly associated with nature and health. It can signify prosperity or danger, depending on the cultural context (Nicholson, 2002; Paul, 2002; Singh, 2006). Its cool tone soothes, calms down, and heals. It is frequently worn in the hospitals and operating rooms by surgeons. Despite that, in the tropical countries it can be perceived as dangerous.

Yellow conveys happiness and optimism but can also imply caution or jealousy. It draws attention and is used in promotional displays (Paul, 2002; Wagner, 1988; Sable & Akcay, 2011). Even though it is one of the first colors that kids reach for, it is generally the lowest liked color and it is seen costing low prices (Paul, 2002). In France it showcases jealousy and infidelity, but in Russian Federation, happiness, pleasantness, taste, and royalty in Peoples Republic of China (Sable & Akcay, 2011).

Orange is energetic and budget-friendly. It's often linked to fun and used for visibility but not ideal for luxury branding (Wagner, 1988; Speichert, 2005; Paul, 2002). It contains many of the qualities that are used to grab attention, is widely used on caution signs and is seen as the color of autumn, Halloween, and Thanksgiving in the U.S. (Wagner, 1988; Speichert, 2005). Additionally, it is favored by the nations of the Netherlands and India (Paul, 2002; pcimag.com).

Brown is earthy and comforting, believed to show stability and reliability, although its effectiveness varies by region (Paul, 2002; pcimag.com, 2002). Mixtures of brownish toned earthy colors are used a lot in furniture making and coverings of floors. Brown is widely used as a color for government offices in Türkiye, as well as for envelopes.

Gray can imply neutrality or confusion but is also seen as elegant and professional, particularly in business settings (Paul, 2002; Nicholson, 2002; Jacobs et al., 1991). Gray is a commonly worn color in men's business attire and continues to gain popularity among businesswomen (Wagner, 1988). In Türkiye, gray is widely accepted in government offices. However, its cultural significance varies in different countries. For instance, in China and Japan, gray is often associated with being inexpensive, while in the United States, it is seen as a color that symbolizes luxury, quality, and reliability (Jacobs et al., 1991).

1.5.2 Color Perception in Türkiye

Türkiye's unique cultural heritage, which blends Eastern and Western influences, is reflected in its color preferences. Red, for example, holds strong nationalistic and emotional significance due to its prominence in the Turkish flag. It is often associated with passion, energy, and vitality, making it a popular choice for branding and packaging in Türkiye. (Alp et al., 2018).

The comparison between Turkish and non-Turkish speakers in detecting subtle differences between shades of blue—specifically within the Turkish language's unique categorization of *mavi* (light blue) and *lacivert* (dark blue)—offers meaningful insight into how language can shape perception. Due to the existence of distinct linguistic terms for these shades in Turkish, it is expected that Turkish speakers are more sensitive to color differences at the boundary between these two categories. In contrast, non-Turkish

speakers, who lack this linguistic distinction, may not perceive the boundary as sharply. This suggests that Turkish speakers are likely to detect color variations more accurately near the mavi-lacivert divide, supporting the idea that language can influence how we visually interpret and categorize color. (Kadıhasanoğlu, 2007)

In the field of architectural design, color is not merely an aesthetic choice but a powerful element that influences perception, emotion, and ultimately, user behavior. A study conducted by Çubukçu and Kahraman (2008) provides valuable insights into how building exterior colors are perceived and evaluated by both professionals and non-professionals. Their research aimed to explore the cognitive and emotional responses of architects and non-architects—specifically high school teachers—toward different hues, levels of saturation, and brightness applied to the façades of buildings. The study was carried out in Izmir, Türkiye, with a total of 60 participants (30 architects and 30 teachers), and employed a two-phase experimental design.

In the first phase, participants were shown eight digitally modified images of the same building exterior, each rendered in a different hue from the HSB (Hue, Saturation, Brightness) color model. Using 7-point semantic differential scales, participants rated each image in terms of preference (like–dislike), arousal (arousing–sleepy), naturalness (natural–artificial), and relaxation (relaxing–distressing). In the second phase, participants evaluated the same building images but with varying degrees of saturation and brightness for each hue. They were asked to select the combination of saturation and brightness they preferred most for each color.

The results of the study revealed several key findings. Yellow and blue hues emerged as the most preferred for building exteriors. However, perceptions went beyond mere liking; certain hues were consistently rated as more arousing, more natural, and more relaxing than others. Notably, gender had a statistically significant effect on color preferences and on how natural or relaxing certain colors were perceived. Furthermore, professional background influenced evaluations: architects and non-architects differed in their judgments of arousal and naturalness, indicating that design training and experience shape perceptual and emotional responses to color.

Another significant outcome was that participants favored colors that were either fully bright with moderate to low saturation, or fully saturated with moderate to high

brightness. These combinations were seen as more appealing compared to dull or overly saturated alternatives. The authors concluded that color selection for building exteriors can have practical implications, potentially influencing a building's frequency of use and its value within an urban context.

Beyond the findings themselves, Çubukçu and Kahraman highlighted a broader issue in architectural practice: the limited integration of color theory and empirical research into the design process. Many architects continue to rely heavily on intuition, personal taste, or traditional practices due to a lack of formal education or collaboration with color scientists. The study underscores the need for increased research on environmental coloration and greater interdisciplinary cooperation between architects and color theorists. Despite the abundance of research on interior color applications, empirical studies on exterior coloration remain scarce, making this study a significant contribution to the literature.

This notable empirical study adds depth to our understanding of how color influences human perception in architectural contexts was carried out by Çubukçu and Kahraman (2008). This research focused specifically on the exterior coloration of buildings and examined how variations in hue, saturation, and lightness impact people's aesthetic judgments and preferences. Unlike many earlier studies that relied on abstract color samples or isolated color chips, this study presented participants with digitally manipulated photographs of a real building. By doing so, it sought to offer a more context-rich and realistic investigation of how people evaluate color in architectural environments.

The results of their study confirmed the significance of all three color dimensions—hue, saturation, and brightness—in shaping visual preference. However, their findings also revealed important discrepancies when compared to previous research. For example, earlier studies often identified yellow as one of the least preferred hues. In contrast, this study found that yellow was among the most liked colors for building exteriors. The researchers proposed that this difference may stem from methodological variations. When colors are evaluated within a meaningful context—such as the façade of a building—rather than in isolation, people's judgments shift accordingly. In Türkiye, for instance,

yellow is a relatively common color for buildings, and this familiarity may influence how "natural" or "relaxing" the color is perceived to be in architectural settings.

Moreover, while earlier literature suggested that highly saturated and very bright colors are generally favored, Çubukçu and Kahraman's findings painted a more nuanced picture. Their participants preferred color combinations that balanced brightness and saturation—either full brightness with moderate to low saturation, or full saturation with moderate to high brightness. This suggests that people might prefer exterior colors that are neither too intense nor too dull, especially when such colors are applied in realistic architectural contexts.

A particularly insightful aspect of the study was its comparative design, which involved two distinct participant groups: architects and non-architects (specifically, high school teachers). The two groups showed notable differences not only in their favorite hues—architects preferred yellow, while non-architects favored blue—but also in how they evaluated colors in terms of emotional and environmental qualities like arousal and naturalness. This divergence supports the idea that training, professional experience, and exposure to design theory shape how individuals assess built environments. As such, the study emphasizes the importance for architects and urban planners to consider the perceptions of the general public—especially when aiming to create spaces that are aesthetically pleasing and psychologically comfortable for users.

Gender differences were also observed in how participants evaluated color, which is consistent with prior studies in the field of environmental psychology and color perception. This point holds potential practical implications for designing gender-sensitive spaces, such as dormitories or healthcare environments, where emotional responses to color may vary by gender.

Despite its contributions, the study acknowledged several methodological limitations. Firstly, it only involved one type of building (a hotel), meaning the results may not be fully generalizable to other types of structures, such as residential homes, office buildings, or public institutions. Secondly, it focused on single-color applications, whereas most real-world buildings use multiple colors, textures, or materials. Additionally, because the color evaluations were based on images viewed on a computer screen rather than physical buildings, future research should investigate how people respond to color in real

environments. Finally, the participant sample was limited to a specific demographic—middle-aged, educated urban residents in Western Türkiye. Broader, more diverse populations would need to be studied to determine how universal these preferences are across different cultures, age groups, and geographic regions.

In summary, the study by Çubukçu and Kahraman highlighted how crucial it is to evaluate color preferences within context, particularly in the built environment. Their research challenges the assumption that results from studies using isolated color samples can be easily applied to architectural design. They advocate for more collaboration between designers and color scientists to ensure that color decisions are grounded in empirical evidence. By doing so, architectural color choices can better align with users' emotional and cognitive responses, potentially enhancing the visual appeal, usability, and even the economic value of buildings. This study thus serves as a strong reminder that the psychological and aesthetic dimensions of color should be carefully considered in architectural practice, particularly in exterior design where first impressions and public engagement are vital.

1.5.3 Color Perception in Kazakhstan

In Kazakhstan, color symbolism is deeply rooted in the country's cultural and historical context. Green is often associated with nature, growth, and prosperity, reflecting the country's vast landscapes and agricultural heritage. Gold and yellow, meanwhile, symbolize wealth, success, and prestige, making them popular choices for luxury brands and high-end products (Kudaibergenov et al., 2019).

Kazakh, the language of Central Asian nomads, is deeply tied to the region's vast landscapes (Olcott, 1981). As noted by Kaskatayeva et al. (2022), color is not merely a visual attribute but reflects the nomadic way of life. The expansive steppes, with their endless blue skies and pristine white snow, serve as both home and inspiration. This profound connection to nature is mirrored in the Kazakh language, which possesses a distinctive color lexicon that reflects the nomads' deep relationship with their environment (Pansat & Khalikova, 2023).

In recent years, the intersection of art, color theory, and emotional perception has garnered increasing attention. Muratbekova and Shamoï (2024) offer a compelling

contribution to this field by developing a novel emotion classification method for visual artworks based on fuzzy logic. Recognizing the inherently subjective and imprecise nature of emotional responses to color, the authors propose a system that mimics human perception more accurately than traditional binary models. Their methodology centers on the use of fuzzy color palettes—120 in total—mapped to a broad emotional spectrum encompassing ten core emotions.

Using the WikiArt dataset, which includes over 42,000 images manually annotated with emotion tags by multiple viewers, the authors extract dominant color patterns associated with specific emotions. Through this process, they establish color-emotion relationships that are both context-aware and consistent with human judgments. For instance, gratitude was most strongly linked to hues such as green, brown, and orange, while emotions like fear and shame were frequently associated with colors like gray and orange, respectively.

One of the unique contributions of the study lies in its transformation of fuzzy color data back into a "crisp" format to create a knowledge base usable in practical applications—ranging from art curation and emotional image retrieval systems to design and marketing. Additionally, the model's accuracy was tested using a Two-Alternative Forced Choice experiment, yielding a high average hit rate of 77%, indicating strong alignment with human responses.

Beyond technical implementation, the study emphasizes the complexity and richness of emotional expression in visual art. Rather than relying solely on basic color categories, the authors argue for the importance of considering color nuance, saturation, brightness, and contextual placement. This depth is crucial not only for theoretical research but also for the development of systems that respond intuitively to human affective experience.

Overall, Muratbekova and Shamoï's work fills a significant gap in the literature by offering a scalable and psychologically grounded method for exploring how color influences emotional perception in art. It also invites further research into how such models can be applied in fields like psychology, design, and art therapy, where understanding emotional reactions to visual stimuli is essential.

This study examines the relationship between colors and emotions, particularly in the context of visual art. Since emotional responses to color are influenced by many personal

factors such as gender, culture, mood, and past experiences, they can be highly subjective (Muratbekova & Shamoï, 2024). To reduce this subjectivity, the focus here is on artworks, where emotional themes are often more consistent and widely recognized.

To identify relevant emotions for this research, various studies and data sources were reviewed, including online art galleries, academic articles, and existing datasets. One key reference is the work of Kang et al. (2015), who studied the connection between color and emotion in visual media.

Based on this research, the following emotions were selected for further analysis: gratitude, happiness, anger, love, trust, fear, surprise, sadness, shame, and shyness. These emotions were chosen because they frequently appear in artworks and have been consistently studied in previous research, making them suitable for comparison.

For the image preprocessing and before analyzing the emotional color content of artworks, all images were prepared in a standardized format. Each image was resized to 200×200 pixels and converted to the RGB color space. Then, following the method described by Muratbekova and Shamoï (2024), each pixel was transformed from RGB to the HSI (Hue, Saturation, Intensity) model. This color model better represents how people perceive colors. To handle the natural fuzziness in color perception, a fuzzy logic approach was used. This means that instead of assigning exact color values, the algorithm allows for more flexible and gradual transitions between colors—closer to how humans actually see and feel colors in art.

First, the main colors in each image were identified. For every image, the five most frequent fuzzy colors were selected as the dominant tones that best represent the emotional impact of that artwork.

Second, for each emotion category (such as fear or love), the dominant fuzzy colors from all related images were collected. Then, the 15 most common colors were selected as the main color palette for that emotion. To ensure quality, only colors that covered at least 3.5% of an image were kept. This helps focus on meaningful colors and remove those that appear only by chance.

These settings—using five colors per image, selecting the top 15 for each emotion, and applying the 3.5% threshold—were adopted from the original study and adjusted to

balance detail and simplicity. They also make the results easier to compare with other studies.

To make the results more practical and easier to compare with existing color-emotion research, the fuzzy colors were finally grouped into basic color categories, such as red, orange, yellow, green, cyan, blue, black, brown, beige, purple, and gray. For example:

dark fuzzy colors were categorized as black, low-saturation colors were labeled as gray, warm tones like brown and beige, common in art, were separated from red or orange, and violet and magenta tones were grouped under purple.

This mapping (also known as defuzzification) helped make the emotional color palettes more understandable and aligned with common color terms used in other studies.

Understanding how colors in artwork relate to human emotions is an important area of study, and recent research has shed light on some interesting connections. One study looked closely at paintings and identified which colors tend to be linked with specific feelings like gratitude, happiness, anger, love, trust, fear, surprise, sadness, shame, and neutrality (Muratbekova & Shamoï, 2024).

The researchers used a special technique to analyze the colors in paintings, focusing not just on exact colors but on “fuzzy” color categories that better reflect how colors are perceived in real life. This approach helped them find dominant color palettes associated with each emotion. For example, feelings such as gratitude and love were often tied to earthy greens, browns, and oranges, while surprise was linked to lighter, cooler colors like beige and cyan. On the other hand, anger was connected with more intense colors like red, black, brown, and gray. Fear and sadness shared similarities, with a strong presence of gray tones.

An interesting finding was the frequent appearance of brown across many emotions. This likely reflects the color’s role in representing human skin tones in art, as well as its natural and cultural symbolism, which often gives it a grounding, neutral presence in paintings. The study also found that artworks considered emotionally neutral tended to have softer, less saturated colors, lacking the darker tones seen in other emotions.

To make sure their model worked well, the researchers also tested it by asking people to compare pairs of paintings and choose which better represented certain emotions. The

results showed a good match between the model's predictions and how people actually perceived the emotions in the artwork.

This study proposed an innovative approach to understanding emotional responses to visual art by analyzing color-based features through the lens of fuzzy logic. By bridging computational techniques with psychological insight, the research offered a fresh perspective on how humans emotionally engage with color in artworks.

Using a diverse dataset of artworks, the system extracted dominant color palettes and associated them with ten predefined emotions. The method was validated experimentally using a two-alternative forced choice (2AFC) procedure, which yielded an average agreement rate of 77% between system predictions and human participants' judgments. This high alignment underscores the system's effectiveness in approximating human emotional perception based solely on color features.

The decision to apply fuzzy sets was particularly beneficial, as it mirrors the ambiguous and often fluid nature of emotional interpretation. Unlike binary classification methods, fuzzy logic allows for degrees of association, making it more compatible with the nuances of human affective experience. The results not only support the method's validity but also suggest potential applications in emotion-aware systems—ranging from content recommendation engines to personalized design tools and user experience platforms.

Nonetheless, there are certain limitations to acknowledge. The method's focus on color alone omits other influential elements such as texture, composition, and subject matter—all of which can meaningfully shape emotional interpretation. Additionally, cultural and individual differences in color perception were not fully accounted for, which could impact generalizability. Another challenge lies in the dataset's imbalance: some emotions were underrepresented, which may have biased the color-emotion relationships identified.

Recent research conducted by scholars at the Kazakh-British Technical University has shed new light on how color contributes to emotional perception, particularly through a study that applied fuzzy logic to the emotional analysis of artwork. Rather than treating emotional response as binary—where a color is either happy or not—the researchers adopted a more nuanced model. They proposed that emotions linked to color exist along

a spectrum, allowing for degrees of intensity and subtle overlaps. Using a broad emotional range and a rich palette of color variations, they were able to identify dominant color-emotion patterns within art images. Their study revealed, for instance, that certain hues like green and brown often corresponded with gratitude, while gray was strongly tied to fear.

Though the study was rooted in art analysis, its implications extend far beyond the gallery. Emotions evoked by color play a critical role in everyday decision-making, particularly in how people respond to products and brands. In the realm of consumer behavior, packaging color is not just decorative—it silently communicates qualities like trust, warmth, sophistication, or energy. When a person sees a chocolate bar wrapped in deep brown tones or a cereal box featuring bright yellow, their brain may automatically associate these colors with comfort, sweetness, or happiness—even before any logical assessment takes place.

This emotional shortcut has practical consequences, especially in the context of product packaging, where color can be the deciding factor in a purchase. For businesses, understanding these color-emotion linkages is essential when targeting consumers across different cultures. While some associations, such as yellow with happiness or red with excitement, appear to be broadly consistent, subtle cultural differences still exist. What one society views as calming and trustworthy, another might interpret as cold or distant.

The significance of such differences becomes particularly important when comparing consumer behavior in countries like Türkiye and Kazakhstan. Although both cultures may share common preferences due to regional influences, variations in tradition, symbolism, and aesthetic standards may cause certain packaging colors to be more persuasive in one context than the other. Therefore, drawing from psychological models and data-driven studies of color perception—as done in the aforementioned research—provides a valuable foundation for investigating how packaging design influences purchase intentions in diverse cultural settings.

CHAPTER 2. PACKAGING COLOR AND CONSUMER PURCHASE INTENTIONS

Section 1 aims to examine how color affects consumer behavior through emotional and psychological responses. It explores the contrasting effects of warm and cool colors, their impact on brand perception, and their influence within various retail and service environments. Special attention is given to how colors are used in settings like restaurants and how they can shape customer experiences, including perceptions of waiting time. Section 2 focuses on the packaging as a critical factor in the purchasing process. It analyzes how visual design elements, particularly color, serve as subconscious triggers that influence buying decisions. This section emphasizes how color functions as a silent yet powerful communication tool that drives consumer attention and preference. Section 3 investigates how different age groups perceive and respond to color in packaging. Using Generational Cohort Theory as a framework, it compares the preferences and behavioral patterns of Baby Boomers and Generation Y, revealing how generational identities shape responses to marketing stimuli, particularly packaging colors.

2.1 The Psychology of Color in Marketing Applications

The emotional impact of colors primarily stems from their influence on the activation dimension of an individual's emotional state. According to Norman et al., the term "color affect" encompasses a wide range of emotional responses, including feelings, moods, and psychological effects. These emotional responses are generally categorized into three types: activation and excitement, calmness or pleasure, and dominance or control.

Research indicates that warm colors, such as red, yellow, and orange, stimulate the sympathetic nervous system, leading to increased blood pressure, heart rate, and respiratory rate. In contrast, cool colors like blue, indigo, and purple activate the parasympathetic nervous system, which can lower blood pressure and slow the respiratory rate. Furthermore, bright colors—such as white, pink, and light blue—tend to evoke positive emotions like happiness and excitement, whereas darker shades, including brown and black, are associated with more negative reactions. Red, for example, is linked to heightened excitement and even aggression, while green is more likely to induce feelings of withdrawal, and black can provoke anxiety. Light and calming colors generally

promote relaxation and a sense of ease, while darker, more intense hues are stimulating and energizing. Notably, long-wavelength colors, particularly red, have a stronger stimulating effect compared to short-wavelength colors like blue and green, which promote a sense of calm.

In the context of consumer behavior, Belize et al. suggest that using cool colors in retail spaces can encourage logical and deliberate shopping decisions, while warm colors are more effective in prompting impulsive purchases. For example, a blue background tends to increase purchase intentions for thoughtful, high-involvement products such as appliances, televisions, and furniture, compared to a red background. Additionally, consumers generally perceive stores with cool color schemes as more appealing and enjoyable than those with warm tones. Studies by Mikkelides, Valdez, and Wardvi also reveal that highly saturated colors are more stimulating, while brighter, less saturated hues are associated with feelings of relaxation and cheerfulness. Colors such as red and yellow are often used to capture attention and stimulate appetite, whereas blue and green have a calming effect on consumers.

Not all colors attract attention equally. Among the most attention-grabbing hues, orange ranks first, followed by blue, green, and yellow. Furthermore, using a solid-colored background instead of an image-based one enhances visual and cognitive engagement. The human eye perceives red more quickly than blue, which explains why marketers frequently incorporate red in advertising signage to draw immediate attention.

According to Bollomley, brands that project a functional image are better received when presented in blue, while those that convey a social or sensory image are more effective in red. Colors play a crucial role in brand differentiation, as highlighted by Bagshi and Shima, who emphasize that warm hues like red and orange evoke more excitement compared to cooler tones such as blue. In terms of purchasing behavior, red is associated with less favorable outcomes. It tends to discourage immediate purchases, increase decision delays, and reduce browsing and product exploration. While red is more stimulating than blue, the latter fosters a sense of calm and positivity, which can influence consumer perceptions and behaviors in a more favorable manner.

In summary, colors have a profound effect on emotional and psychological states, influencing mood and behavior. Each color elicits specific emotional responses—yellow is linked to happiness, red to excitement, and blue to calmness. This understanding of color psychology is essential in fields like marketing and design, where strategic use of color can significantly shape consumer experiences and decisions.

2.1.1. Psychological Effects of Warm vs. Cool Colors

Color plays a significant role in atmospheric design and can even influence how people navigate and perceive space (Kotler, 1973). It's important to note that the meaning conveyed by color is highly dependent on context (Grieve, 1991; Elliot et al., 2014). For instance, pink is often used in hospitals and schools to create a calming and subdued atmosphere, while green is associated with relaxation, and red tends to feel more intense and stimulating (Moser, 2003). These effects are often applied strategically—sports stores, for example, frequently incorporate blue and green tones to promote a sense of energy and freshness, while casinos lean toward red hues to capture and sustain attention (Grossman & Wisenblit, 1999).

In a study by Bellizzi et al. (1983), researchers explored how color affects consumer behavior in retail settings. They found that warm colors—such as red, orange, and yellow—attracted more foot traffic and were especially effective for window displays, entrances, and promotional areas. However, while these colors initially drew people in, they also led to negative perceptions of the space, with participants describing the environment as tense, unpleasant, and less appealing overall.

In contrast, cool colors like blue and green tend to be more effective in helping consumers make difficult purchasing decisions. Studies have shown that retail spaces featuring blue tones not only encouraged more purchases but also led to fewer instances of customers delaying their decisions. Shoppers in these environments were generally more willing to browse and engage with the store (Bellizzi & Hite, 1992). Chebat and Morrin (2007) further explored the psychological impact of warm versus cool colors in mall decorations. Their findings suggest that consumer responses were largely driven by emotional factors such as mood, as well as cognitive evaluations like perceptions of the mall's overall

quality. These same psychological processes are likely to apply in digital settings as well. Online platforms, including websites and advertisements, must convey the right emotional tone—and color is a critical part of that. As Norman (2002) pointed out, color not only shapes the aesthetic appeal of digital spaces but also plays a vital role in creating emotional responses.

Atmospheric elements in online shopping environments can influence how users feel and think, which in turn affects their buying behavior (Eroglu et al., 2001). Cool-toned backgrounds—especially those in shades of blue—can enhance the perceived value of promoted products and reduce the likelihood of customers postponing purchases. Interestingly, this effect appears to be even stronger among individuals who frequently shop online (Biers & Richard, 2002, as cited in Pélet & Papadopoulou, 2010).

Previous studies have shown that color temperature can significantly affect how we perceive space. For example, rooms painted predominantly in red tend to feel smaller, while identical spaces with blue as the main color are perceived as more spacious (Yildirim & Hidayetoglu, 2011). A similar pattern emerges when people are asked to judge the size of product packaging. Even when packages are physically the same size, those in red are often perceived as larger, whereas blue ones are seen as smaller (Tedford et al., 1977; Hagtvedt & Brasel, 2017). These observations suggest that warm and cool colors may shape our sense of psychological distance—a concept central to construal level theory. This connection highlights the importance of further exploring how color temperature might influence the way individuals mentally construe objects, environments, or decisions. The way product information is presented—whether in a detailed or abstract manner—combined with background color, has been shown to influence consumer responses (Mehta & Zhu, 2009). In one study, participants viewed two different advertisements for a camera on a computer screen, with one version offering detailed information and the other abstract descriptions. These were paired with either a red or blue background. Results showed that when the product was described in detail, the advertisement received more favorable responses when set against a red background. Conversely, when the information was abstract, participants responded more positively to the ad with a blue background.

One possible explanation for these results lies in the idea of congruency between construal level and color. Detailed product descriptions align with a low-level construal, which may resonate more with the psychological effects of the color red. Abstract information, on the other hand, is associated with high-level construal thinking, which may be more easily processed in the context of a blue background—creating a sense of harmony between message and visual atmosphere.

2.1.2 Visual Design Elements in Packaging

Over the past decade, packaging has gained increased attention as a key factor influencing consumer behavior and decision-making, particularly at the point of sale (Kuvykaite, Dovaliene, & Navickiene, 2009). It is now widely recognized that a product's design and presentation can significantly impact its success or failure in the marketplace (Berkowitz, 1987). Beyond its primary function of protecting physical contents, packaging acts as a crucial interface between the brand and the consumer (Rod, 1990), conveying both conceptual and sensory information that enhances the product's perceived value. This dual role makes packaging a powerful tool for communication and branding (Ruth & Carol, 2000).

In the context of food products, packaging characteristics are often linked to perceptions of quality, shaping consumer expectations and satisfaction over time (Pinya & Mark, 2007). Research indicates that packaging plays a significant role in defining a brand's perceived meaning (Underwood, 2003). Thoughtfully designed packaging can effectively communicate and reinforce brand identity and values, helping to establish a lasting connection with consumers (J. Schoormans, den Berge, van de Laar, & van den Berg-Weitzel, 2010).

Researches have consistently shown that packaging color can significantly influence consumer preferences and purchasing decisions. A study by Spence et al. (2015) found that consumers tend to associate bright, saturated colors with energy and vitality, making them ideal for products like energy drinks and sports beverages. In contrast, darker, more subdued colors are often associated with luxury and sophistication, making them suitable for premium products. Visuals with colors have a far greater impact compared to non-colored ones, as color advertisements attract up to 80% more viewers. The ads boost

product sales by over 50% and improve content retention among readers from 55% to 80%. When comparing sensory roles in purchase decisions, 92% of participants identified the visual factor as the most influential, while only 5.6% prioritized touch, and hearing and smell accounted for just 0.9%. Color plays a pivotal role in visual perception, attention, and product appeal, shaping consumer preferences alongside price, quality, and other key factors, ultimately influencing purchasing decisions.

2.2 Color and Brand Perception

Consumers don't just gather product information from packaging and color—they also form associations with the colors brands use to stand out from competitors. According to Moser (2003), color plays a role in corporate branding in three main ways: through its level of sophistication, its uniqueness within a product category, and its capacity to evoke emotional reactions. Basic, vivid colors are often seen as bold and energetic—for example, the bright tones used in traffic signs. In contrast, more refined or muted tones are perceived as elegant and are often used to foster a sense of closeness or trust. Color also helps brands visually separate themselves from others in the same market, a strategy often referred to as "visual branding." Additionally, because certain colors are commonly linked to specific emotions, they can be leveraged to support emotional branding strategies, allowing companies to appeal to target audiences on a deeper, more emotional level.

2.2.1. Color Role in Restaurants

In the world of retail, a customer's first visual impression of a store can significantly shape their perception of the brand, highlight shopping opportunities (Kerfoot et al., 2003; Quartier et al., 2009; Ebster and Garaus, 2011), and even trigger impulse purchases (Law et al., 2012; Mehta and Chugan, 2013; Hussain and Mashar, 2015). Among the many aesthetic elements used to influence customer behavior, color stands out as a powerful tool. It's frequently employed in store design and decoration because of its ability to draw attention and affect customers on both emotional and behavioral levels (Brengman, 2002; Babin et al., 2003; Ryu and Jang, 2008; Jang and Namkung, 2009; van Rompay et al., 2012; Cho and Lee, 2017).

Extensive research has explored how color influences feelings and actions. For instance, interior color schemes have been closely linked to emotional responses (Bellizzi and Hite, 1992; Ward and Barnes, 2001; Chebat and Morrin, 2007; Yildirim et al., 2012), store image (Bellizzi et al., 1983; Baker et al., 1994), and even how customers make decisions regarding products and retail environments (Bregman, 2002; Babin et al., 2003; Westerman et al., 2012; Han et al., 2014). However, there has been relatively little focus on how color-induced emotions influence customer behavior specifically in restaurant settings.

For instance, In Thailand, the restaurant industry has become one of the most dynamic and competitive sectors, with annual growth rates between 3–6% in recent years, leading to a surge in new restaurant openings (Kasikorn Research Center, 2014). In such a saturated market, where customers have plenty of choices, the ambiance—particularly visual elements—plays a key role in influencing whether they approach or avoid a venue (Turley and Milliman, 2000; Oh and Petrie, 2012). To stand out, restaurant owners need innovative yet cost-effective strategies to capture customer attention. One promising approach is selecting or adjusting the restaurant's interior color scheme.

Colors play a significant role in shaping customer behavior in restaurants. Fast-food businesses frequently use red due to its stimulating effect on human metabolism, which can increase hunger and prompt customers to order more. Additionally, yellow is a popular choice because it captures attention, sparks curiosity, and encourages patrons to engage with the brand. This strategic use of warm colors is an effective method for fast-food chains to boost sales. Söker (2009) explored how restaurants are categorized by consumers and found that warm colors tend to be associated with lower prices compared to cool colors. Interestingly, warm hues were also perceived as more pleasant by customers. Similarly, Jacquier and Giboreau (2012) examined how different color atmospheres impact customer emotions in restaurants. They observed that environments with dominant warm tones, like red and black, often led to feelings of stress, reduced excitement, and perceptions of noise. Wardono et al. (2012) further emphasized the importance of design, revealing that dining environments with monochromatic colors, subtle lighting, and minimal decor were seen as romantic by customers, influencing how

they interpreted sociability, emotions, and their overall behavioral intentions during social dining experiences.

In contrast, upscale dining establishments often incorporate blue in their décor to create a calming and relaxing atmosphere. This soothing environment encourages guests to linger longer, increasing the likelihood that they will order additional items such as larger meals, wine, coffee, or dessert. This extended-stay strategy can significantly enhance revenue for fine dining restaurants. However, excessive use of blue may suppress appetite, which is an outcome these establishments generally wish to avoid.

Interestingly, the appetite-suppressing effect of blue can be advantageous for all-you-can-eat buffet restaurants that charge a fixed price. In such cases, if customers consume less, the restaurant saves on food costs while maintaining a steady revenue stream. Nevertheless, for this approach to be effective, other factors—such as the restaurant's ambiance, food quality, and customer service—must also be appealing to ensure a positive dining experience and customer satisfaction.

Othman and Goodarzirad (2013) argued that a sense of pleasure plays a key role in shaping customer behavior in restaurants, and that both wall colors and decor should aim to create a pleasurable ambiance. Much of this discussion aligns with the Stimulus-Organism-Response (SOR) framework, which suggests that environmental cues influence customer behavior by triggering emotional responses. This model has been applied across various service contexts, such as retail (Turley & Milliman, 2000; Brengman, 2002), hospitality (Countryman & Jang, 2006), and sports venues (Wakefield & Blodgett, 1996), though relatively fewer studies have focused on restaurants.

Notably, Ryu and Jang (2008) used structural equation modeling to demonstrate that aspects like facility aesthetics, ambient conditions, and layout significantly enhance customer pleasure, which in turn influences behavioral intentions. Building on this, Jang and Namkung (2009) expanded the SOR framework by incorporating restaurant-specific environmental stimuli and emotional responses, concluding that both atmosphere and service quality play crucial roles in evoking positive emotions. Liu and Jang (2009) added to the conversation by suggesting that cognitive elements like perceived value also impact customer responses, proposing a unipolar discrete emotion model alongside the original

SOR pleasure-arousal scale (1974). Lastly, Ryu and Han (2011) introduced a conceptual model identifying factors like aesthetics, lighting, and staff service as key predictors of customer experience—especially for first-time visitors who may place greater emphasis on the physical environment. However, the role of disconfirmation in shaping emotional responses remains an area that has yet to be fully explored.

2.2.2. Colors and Perceived Waiting Time

Colors influence the perception of time in various ways. Under red lighting, time seems to pass more slowly, and objects appear larger and heavier. In contrast, blue lighting gives the impression that time moves more quickly, while objects seem smaller and lighter. Casinos often leverage this concept by using red lighting to create an environment where patrons feel as though time is slowing down, encouraging them to stay longer without feeling they are wasting time.

Color doesn't just help brands stand out—it also plays a key role in conveying their market positioning. In the United States, for example, blue is commonly linked with reliability and professionalism, which explains why many financial institutions and large corporations choose it for their logos (Labrecque & Milne, 2013). This preference is likely connected to the way consumers perceive competence when a brand's color aligns with its industry and messaging (Labrecque & Milne, 2012). Green, on the other hand, is often used by companies that want to project a sense of innovation and care, while yellow is associated with youthfulness, energy, and creativity (Cheskin & Masten Inc., 1987, as cited in Aslam, 2015). However, cultural context plays a significant role in how colors are interpreted and used. In the U.S., blue is typically seen as the go-to corporate color, while in East Asian countries, red is more commonly favored in business settings (Schmitt & Pan, 1994). Color also supports brand recognition and memory. Take soda brands, for instance—Coca-Cola is strongly associated with red, Pepsi with blue, and green often brings to mind brands like 7-Up or Canada Dry (Cheskin & Masten Inc., 1987, as cited in Aslam, 2015).

Using color to stand out from the competition can be especially effective in certain buying situations. When a customer is making a purchase decision—particularly at the point of sale—strategic use of color can help capture their attention and potentially trigger an

impulse buy. Warm tones like red and yellow are especially effective in these contexts. Not only do they draw the eye, but they also help consumers distinguish between different products and brands, making it easier for them to spot and select their preferred option (Kauppinen-Räsänen & Luomala, 2010).

2.3 Packaging as a Marketing Tool

When selecting effective communication strategies, the type of retail format plays a major role in how products are marketed. Rentie and Brewer (2000) highlight that around 73% of purchase decisions are made at the point of sale. This means that, in many cases, consumers only start evaluating brand options once they are physically in the store. The purchasing process itself is complex, and research supports this complexity. Studies have found that shoppers typically spend about 20 minutes in a store, during which they are exposed to roughly 20 products per second—amounting to a theoretical 24,000 brand exposures. Of course, consumers don't consciously evaluate all of these options, but the sheer volume reinforces the growing importance of in-store communication.

As a result, there's a noticeable shift away from traditional advertising methods in favor of strategies that engage the consumer directly at the point of purchase. This shift places packaging at the forefront of brand communication and product differentiation. In many cases, packaging serves as the final and most impactful opportunity for a brand to capture attention and convey essential information.

Effective packaging not only helps reinforce a product's position in the consumer's mind but also plays a key role in shaping their purchasing decisions. A review of insights from Rentie and Brewer (2003), Jakupov and Kacalov (2003), Ampeoro and Vila (2006), Wade (2005), and Voyles (2005) highlights several key factors that contribute to the growing importance of packaging. One of the primary reasons is the declining effectiveness of traditional promotional tools, while packaging has become an increasingly powerful means of communication. There's also a noticeable shift in the marketing landscape, where the emphasis is moving away from conventional advertising towards in-store communication, recognizing the critical influence of packaging at the point of purchase.

Additionally, as brand differentiation becomes less pronounced in the minds of consumers, packaging plays a stronger role in helping products stand out and remain identifiable. Expectations around product quality and its preservation are rising, as are concerns about product safety and consumer well-being. Shoppers are also demanding more transparency and clearer presentation of product information. On top of all this, packaging is now seen as a tool that can add real value to the product itself, enhancing the overall customer experience.

According to Ampeoro and Vila (2006), packaging is one of the most effective tools in marketing communication. It has the advantage of reaching nearly every consumer within the product category, engaging with them at the most critical moment—right when they're making a purchasing decision. At that point, consumers are actively involved in the communication process, examining the packaging to obtain the information they need. These insights underline the increasing significance of packaging for both producers and consumers, and they highlight the value of studying packaging as a subject of academic and scientific research.

The shift from traditional direct selling to self-service retail formats has significantly expanded the variety of products available within many categories. This expansion has intensified competition among brands and increased the importance of strategic marketing communication. With countless brands on the market, consumers now face greater difficulty in identifying and choosing between them. As a result, packaging has gained more attention, serving as a crucial element of both the product and its brand identity.

In self-service settings, packaging plays a direct role in communicating with the consumer, often becoming a deciding factor at the point of sale. Research has shown that packaging decisions can successfully capture consumer attention, convey key product information, shape brand perception, and distinguish a product from its competitors. These functions allow packaging to influence the decision-making process and, in some cases, provide a long-term competitive edge.

Despite extensive research into individual packaging functions and their significance, packaging is still rarely studied as a complete communication tool. Therefore, this article seeks to explore both theoretical and empirical perspectives to better understand how

different packaging elements communicate with consumers and impact their purchase decisions.

The shift from traditional direct selling to self-service retail formats has led to a significant expansion in product variety across many categories. This increase in assortment has heightened competition among brands and encouraged broader use of marketing communication strategies. With so many options available, it has become more challenging for consumers to recognize and choose between brands. As a result, greater emphasis is placed on packaging, which serves as a key component of both the product and its brand identity. Packaging plays a vital role in delivering information to consumers, especially in self-service environments where it acts as a silent salesperson at the point of sale. In this context, packaging has become a critical factor in shaping consumer choice.

2.3.1 Color as a Subconscious Purchase Driver

Organizations often take an active interest in the interior color scheme of their offices, driven by the belief that thoughtful color selection can boost employee productivity. Stimulating hues such as red, orange, and yellow are frequently favored for their energizing and activating qualities. In contrast, other companies may prefer more calming tones like pale green, soft yellow, or off-white to foster a tranquil work atmosphere that enhances concentration and task performance (Wollard, 2000).

A review of past literature reveals that color significantly influences how messages are perceived, thereby playing a key role in enhancing the message's effectiveness. Color contributes to product appeal, credibility, and consumer persuasion through various mechanisms. First, it can unify visual components and emotional undertones in visual media such as advertisements or posters. Second, color can make visuals more lifelike, improving realism and relatability. Third, colors can serve symbolic functions by transferring meaning and identity from one object to another through metaphorical association (Favre, 1979).

Moreover, according to Meyers-Levy and Peracchio (1995), when a consumer's motivation to engage deeply with advertising content is low, judgments tend to rely on surface-level cues. These may include the aesthetic appeal of images, the featured

product, or the person representing it. Since color can enhance the perceived attractiveness of such visual elements, advertisements incorporating color are more likely to evoke favorable attitudes compared to those presented in monochrome.

However, in scenarios where consumers are highly motivated to scrutinize an advertisement's claims, the use of color can yield one of two outcomes. On one hand, color might support the message by facilitating inferential processing, especially when the visual elements align with the message's intent. On the other hand, it may hinder the message's credibility by diverting cognitive resources away from processing the core information, thereby weakening the impact of the argument.

Previous researches have demonstrated that consumer preferences for certain goods are influenced not only by product color but also by individual characteristics and income levels. These elements collectively play a significant role in shaping purchasing behavior. In an effort to better understand these patterns, the Cooper Marketing Group (1994) categorized consumers into three distinct "Color Lifestyle" segments, each defined by how color impacts their purchasing decisions.

1. **Color-Forward Consumers:** This group includes individuals who are enthusiastic about experimenting with new colors and are typically willing to pay a premium for the latest trends. They represent a substantial portion of the market and are most commonly women under 30 or over 50, as well as men under 30. These consumers are often urban residents, impulsive buyers, and typically earn less than \$35,000 annually.

2. **Color-Prudent Consumers:** Members of this segment are cautious about adopting new colors and generally prefer to see others try them first. Their purchasing decisions prioritize product quality over visual appeal. Demographically, they are men and women between 30 and 50 years old, typically residing in suburban areas, with a relaxed shopping style and an annual income exceeding \$50,000.

3. **Color-Loyal Consumers:** These buyers consistently choose classic or neutral colors such as blue, gray, and black, avoiding trend-driven shades. They tend to be men aged 60 and above, living in suburban or rural areas. Their income levels vary widely, but their purchasing habits are steady and predictable, as they often choose the same colors year after year.

2.4 Generational Differences in Color Preference

Clothing color has been shown to impact consumers on a psychological level (Lind, 1993). For instance, Roberts and colleagues (2010) discovered that individuals wearing red are often viewed as more attractive and successful. Kobayashi (1991) introduced a two-dimensional color image scale using adjectives such as "warm-cold" and "soft-hard" to measure the psychological implications of colors. These emotional and symbolic effects, however, are not universally perceived; they can differ significantly across cultural backgrounds and age groups.

2.4.1 Overview of Generational Cohort Theory

Generational Cohort Theory, derived from Strauss and Howe's (1991) work *Generations: The History of America's Future*, suggests that individuals born within the same time period—referred to as cohorts—share formative experiences that shape their worldview. These shared historical and societal events influence the values, behaviors, and attitudes of each cohort (Edmunds & Turner, 2005). For example, according to Jackson, Stoel, and Brantley (2011), societal developments and landmark events influence the beliefs and choices of a generation. Baby Boomers, for instance, may prioritize issues like healthcare, whereas Generation Y tends to focus more on career-oriented topics, such as occupational therapy (Davis, 2004).

2.4.2 Baby Boomers vs. Generation Y

Baby Boomers refer to individuals born roughly between 1946 and 1964. In 2017, they were aged between 53 and 71 years, and approximately 75 million of them were over 65 years old (Joung & Miller, 2007). Their fashion preferences tend to evolve with age, often gravitating toward more comfortable and loose-fitting garments, such as dresses without defined waistlines (Marjanen & Kohijoki, 2014; Jackson & O'Neal, 1994). In contrast, Generation Y—typically identified as the children of Baby Boomers—tends to favor form-fitting styles. This cohort integrates technology into their everyday lives and is often characterized by a strong sense of diversity and optimism (Fisher & Crabtree, 2009).

Consumer psychology and color preference have long been recognized as important variables in understanding behavior across different age groups. According to Tangkijviwat and Shinoda (2008), age significantly influences color preferences—with

older individuals gravitating toward vivid and lively hues, while younger consumers tend to favor more subdued, neutral tones. Supporting this, Ou et al. (2012) found that people of varying ages interpret emotional connections to colors differently.

Building on this, a study by Chang and Shin at Texas Tech University examined generational contrasts in clothing color perception, comparing Baby Boomers with Generation Y. The researchers surveyed 100 participants—50 from each generation—using a 7-point Likert scale to measure reactions to clothing shown in eight different colors. These included four warm tones (red, yellow, orange, brown) and four cool tones (white, teal, cobalt, and black). Participants were primarily White/Caucasian, with the average age for Generation Y being 30, and 67 for Baby Boomers.

Although both groups exhibited similar impressions regarding color attributes such as warmth, softness, modernity, and youthfulness, notable differences emerged in specific color preferences. For instance, Baby Boomers showed a stronger preference for orange garments, while Generation Y consumers tended to view that same color as outdated. Additionally, younger respondents perceived brown as unfashionable and old-fashioned. The study also explored the psychological drivers behind these preferences. It found that participants who expressed greater interest in fashion and held higher levels of self-esteem were more inclined to favor bold clothing colors such as red. These psychological factors played a meaningful role in shaping attitudes toward color selection in fashion. The research highlighted that Baby Boomers and Generation Y differ in how they perceive and prefer clothing colors. Baby Boomers are generally more inclined toward bright, lively tones like orange, whereas Generation Y tends to gravitate toward darker shades such as black. Certain colors considered appealing by one group may be deemed outdated or unfashionable by the other. Psychological variables, including fashion involvement and self-esteem, also contribute significantly to these generational differences in perception.

These findings hold valuable implications for fashion brands, designers, and apparel retailers. Understanding the generational differences in color preference can assist in tailoring product designs and marketing strategies to better meet the tastes of targeted demographics. Further studies are recommended to explore the psychological dimensions

of fashion preferences, particularly as they relate to generational identity and design interpretation.

CHAPTER 3. METHODOLOGY AND EMPIRICAL DATA ANALYSIS

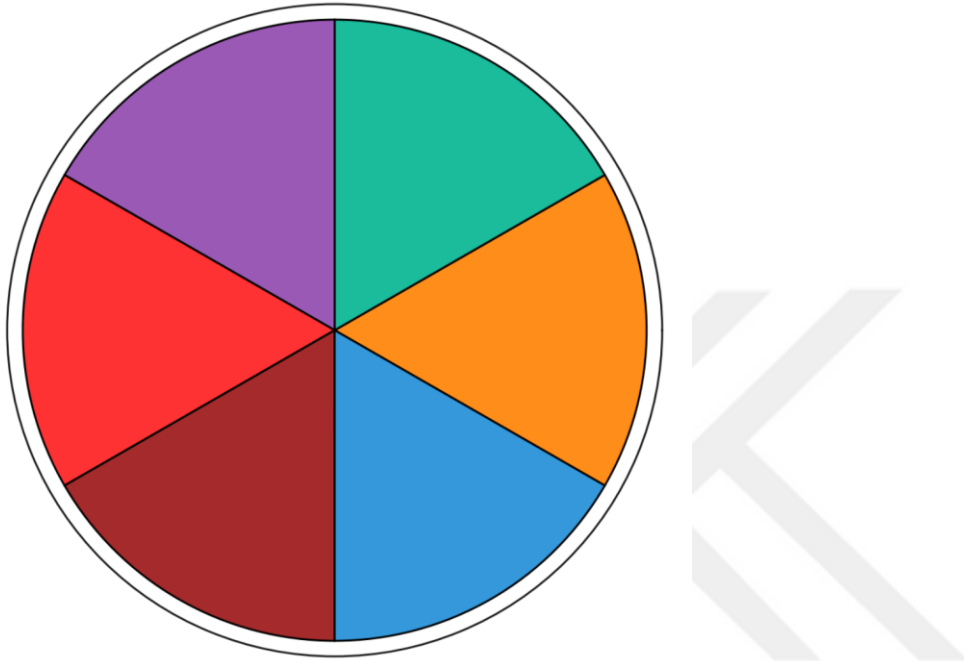
Chapter 3 outlines the research design, data collection, and analysis process used to explore how packaging color influences consumer behavior from a behavioral economics perspective between Türkiye and Kazakhstan. The study began with the methodological foundation and analytical approach of this study, explaining how the research was designed and carried out to explore the impact of packaging color on consumer decision-making. Section 1 begins with a color differentiation pretest to ensure participants could reliably distinguish between warm and cool tones, followed by the development of a structured survey instrument. Section 2 explains the sampling strategy and data collection methods. To ensure cultural diversity and comparative insight, the research was conducted in both Türkiye and Kazakhstan, using a combination of online and face-to-face questionnaires. Section 3 focuses on how the data were processed and analyzed. After preparation and coding in SPSS, various statistical methods—such as t-tests, regression analysis, and ANOVA—were used to test the hypotheses. Section 4 presents the empirical findings and interprets them within the behavioral economics framework and in both. The study included participants from Generations X, Y, and Z to explore generational and cultural influences on color preferences within the realm of BE.

3.1 Color Categorization, Pre-test and Methodology

To investigate how participants intuitively perceive color temperatures, a custom-designed color wheel was developed for this study. It featured six distinct colors—red, brown, purple, blue, orange, and teal—arranged in equally spaced segments. These colors were deliberately positioned in a non-sequential, randomized order to prevent any pattern recognition that might bias the participants' responses.

Figure 3.1

Color wheel illustrating commonly recognised warm and cool colors



The proposed color wheel (Figure 3.1.) demonstrates six distinct colors that are arranged in equal segments. The colors in the color wheel were purposely placed in random order. The colors are red, purple, teal, orange, blue and brown.

The color selection was guided by well-established associations in visual perception and psychological literature and the latest research. Certain hues, such as red, orange, and brown, are commonly described as "warm" colors, often evoking sensations of heat, energy, and intensity. In contrast, colors like blue, teal, and purple are generally seen as "cool," conveying impressions of calmness, relaxation, and lower temperatures. By incorporating a balanced mix of these categories, the color wheel allowed for a straightforward yet insightful exploration of participants' intuitive understanding of color temperature.

1.Participants

A total of 25 adult learners, aged between 25 and 35 (which belong to Generation Z and Generation Y/Millennials), were recruited from the English Language Course in Eskişehir, Türkiye. These particular age group was selected to ensure relative homogeneity in terms of cognitive maturity and exposure to cultural and media representations of color. The goal was to minimize variability stemming from generational or educational differences that might influence perceptions of color.

2. Procedure

Each participant was presented with the color wheel individually during a face-to-face session. They were asked a single open-ended question: “Can you identify which colors on this wheel feel warmer versus cooler?” Importantly, no definitions or examples of “warm” or “cool” colors were provided beforehand, as the objective was to capture participants’ immediate, instinctive responses. Responses were recorded manually. No time constraints were imposed, and each session took approximately 2 to 5 minutes.

This preliminary test was designed as a perceptual categorization task, loosely adapted from the method used by Khan and Dhar (2006) in their research on categorizing virtue and vice in consumer decision-making. Similarly, this study employed a dichotomous framework—warm versus cool colors—to investigate how people sort stimuli based on intuitive emotional or sensory cues.

3. Hypotheses

The pre-test was structured around the following hypotheses:

Hypothesis 1: The majority of participants will correctly categorize warm colors (red, orange, brown) and cool colors (blue, teal, purple) in line with conventional color-temperature associations.

Hypothesis 2: A small subset of participants may misclassify one or two colors, potentially influenced by personal experience, cultural background, or individual perceptual differences.

Hypothesis 3: A very small number of participants may struggle to accurately classify the colors at all, reflecting unfamiliarity with the concept or atypical perceptual responses.

4.Results

The responses yielded the following outcomes:

22 participants (88%) accurately identified all six colors according to conventional warm/cool classifications.

2 participants (8%) correctly categorized most of the colors but misclassified one or two.

1 participant (4%) showed noticeable difficulty, misclassifying more than half of the colors.

These results provide strong empirical support for Hypothesis 1, indicating that the majority of participants possess a reliable intuitive understanding of the distinction between warm and cool colors. The high accuracy rate also affirms the effectiveness of the color wheel as a perceptual tool.

Hypothesis 2 was similarly validated. The two participants who made minor classification errors may have been influenced by subjective factors, such as personal associations with specific colors or non-standard cultural interpretations.

Finally, Hypothesis 3 was supported by the response of a single participant who demonstrated significant difficulty with the task. This outcome suggests that while intuitive understanding of color temperature is widespread, there may be outliers who perceive color differently, possibly due to individual, neurological, or experiential differences.

TABLE 3.1*Pre-Test Results on Warm and Cool Color Categorization*

Color	Expected Category	Correct Responses (n = 25)	Accuracy (%)
Red	Warm	25	100%
Orange	Warm	25	100%
Brown	Warm	22	88%
Blue	Cool	25	100%
Teal	Cool	23	92%
Purple	Cool	24	96%

This Table 3.1 presents a detailed breakdown of correct classification rates for each individual color used in the pre-test. While universally recognized tones like red, orange, and blue were identified correctly by all participants (100%), more ambiguous shades such as brown, teal, and purple showed minor deviations, reflecting subtle perceptual variation.

5. Conclusion

Overall, the pre-test confirmed the usefulness of the six-color wheel in capturing intuitive judgments about color temperature. The findings strongly support the proposed hypotheses and confirm that color perception—particularly in the context of warmth and coolness—is broadly consistent across individuals within this demographic. This preliminary validation sets a reliable foundation for further research into how packaging color may influence consumer perceptions and purchase intentions in the main study.

3.1.1 Purpose and Structure of the Research

In an increasingly globalized and competitive marketplace, businesses are constantly seeking innovative ways to engage consumers and influence their purchasing decisions. One of the more subtle yet powerful tools available to marketers is color—particularly the strategic use of packaging color to shape perceptions, evoke emotions, and guide consumer behavior. This study focuses on the psychological impact of packaging color, specifically the contrast between warm and cool tones, on consumer purchase intentions in two culturally distinct yet rapidly developing markets: Kazakhstan and Türkiye.

Color is more than a visual experience—it is a form of non-verbal communication that conveys meaning and triggers subconscious reactions. In the context of this research, warm colors such as red, orange, and yellow are typically associated with energy, excitement, and warmth. These hues tend to stimulate and attract attention, often evoking feelings of urgency or appetite. (Singh, 2006). In contrast, cool colors like blue, green, and teal are generally perceived as calming, trustworthy, and professional. They are often used to suggest serenity, reliability, or cleanliness, as supported by studies in visual perception and color psychology. (Labrecque & Milne, 2013)

While color theory has long been explored in design and marketing disciplines, its integration into behavioral economics (BE)—a relatively young and evolving field—offers a new lens through which to understand consumer choice. BE examines how real human beings make economic decisions, often irrationally, under the influence of psychological and emotional factors. In recent years, BE has expanded to incorporate concepts like nudging, framing, heuristics, and choice architecture, which seek to guide individuals toward better or more predictable decisions without limiting freedom of choice. (Thaler & Sunstein, 2008)

This study applies these behavioral insights to test how packaging colors—functioning as subtle nudges—might affect purchase preferences, particularly when the product type (e.g., a healthy snack vs. a sweet treat) plays a role. For example, the framing of a "virtue" product (e.g., something perceived as healthy or morally good) in cool tones might reinforce perceptions of cleanliness or wholesomeness. Conversely, using warm tones for a "vice" product (e.g., indulgent or impulsive treats) might intensify desire or emotional

appeal. This aligns with fluency theory, which posits that stimuli that feel intuitive or "fluent" to the viewer are more likely to be favorably evaluated (Reber et al., 2004).

Despite growing global interest in this intersection of color psychology and consumer behavior, there remains a significant gap in region-specific research, particularly in Türkiye and Kazakhstan. In both countries, behavioral economics is still emerging as a practical tool in business and public policy, and its applications to marketing—especially in culturally nuanced contexts—have yet to be fully explored. Cultural attitudes, shopping habits, and emotional responses to color may differ greatly between regions, and understanding these differences can provide valuable insights for companies seeking to localize their marketing strategies.

Moreover, Kazakhstan and Türkiye represent two distinct cultural landscapes with shared historical ties yet unique socio-economic dynamics. Both countries are navigating rapid modernization, increasing consumer awareness, and shifts in lifestyle—all of which make them ideal grounds for testing how seemingly minor design elements, like color, can influence decision-making across different consumer groups. Additionally, In recent years, color perception has garnered increasing interest among researchers, particularly in countries like Türkiye, where several studies have been conducted to explore its cultural, psychological, and linguistic dimensions. This growing body of work reflects a broader recognition of how color perception can vary across different sociocultural contexts. However, despite Kazakhstan's rich cultural and linguistic diversity, the topic remains relatively underexplored within the country's academic landscape. Few comprehensive studies have been undertaken to examine how individuals in Kazakhstan perceive and interpret color, leaving a notable gap in the regional literature. This discrepancy highlights the need for more focused research that considers local perspectives and experiences, thereby contributing to a more nuanced understanding of color perception across Central Asia.

By combining color psychology with the behavioral economics toolkit, this thesis seeks to uncover how visual cues like color can act as cognitive nudges in packaging design—affecting perceptions and purchase intentions in subtle but measurable ways. In doing so, it contributes not only to academic understanding but also to practical applications for businesses operating in emerging markets. Ultimately, the goal is to demonstrate how

interdisciplinary approaches can lead to more human-centered marketing, where decisions are informed not just by data but by a deeper understanding of the psychological mechanisms driving consumer behavior.

As part of the main study, participants were shown sets of images featuring the same product presented in two different packaging colors. These pairs were carefully designed so that everything else—such as the brand name, font style, layout, and product details—remained exactly the same. Only the color of the packaging was changed. The images were displayed within an online questionnaire and face-to-face meetings, to prevent any predictable patterns or bias in the responses, helping ensure that participants' choices were based solely on their reaction to color.

All the product images used in the study were fully original and designed by me, ensuring there were no copyright concerns. To avoid brand influence or language bias, the text on the packaging was intentionally created using nonsensical, gibberish words that do not belong to any real language. This allowed participants to focus purely on the visual design, especially the color, without being influenced by brand names or product descriptions. The two colors chosen for the packaging—yellow and blue—were selected based on the results of the pretest. In that initial test, participants consistently identified yellow as a warm color and blue as a cool one, with the highest accuracy across all color options. These clear associations made yellow and blue ideal for testing how warm and cool tones influence consumer perceptions.

Figure 3.2

Chocolate Cookies in Warm vs. Cool Packaging

Product 3.2 depicts a cookie, as it is a widely recognized and frequently purchased snack across different age groups. As shown in the visuals, it was presented in both yellow and blue packaging to represent the "vice" (indulgent) and "virtue" (healthier) conditions, respectively.



Figure 3.3

Fresh Salad with Warm vs. Cool Label Design

In Figure 3.3, a virtue food (a packaged salad) is shown with labels in yellow and blue. The product itself remains unchanged, while the label color subtly alters how consumers perceive its healthiness and freshness.



The second product is a salad, selected due to its popularity as a quick and easy meal option. Like the cookie, the salad was also shown in both color conditions to explore how packaging color might shift perceptions even for healthier items.

Figure 3.4

Plain Banana Chips in Cool vs. Warm Stand-up Pouches



In Figure 3.4 banana chip pouches were included as a less commonly consumed snack in both Türkiye and Kazakhstan, offering an opportunity to observe how color affects products with lower familiarity.

Banana chips given in figure 3.4, often seen as a borderline product, were used to test ambiguous categorization. Participants evaluated both versions – yellow (suggesting sweetness and familiarity) and blue (suggesting cleanliness or control).

Figure 3.5

Banana Chips with Caramel in Warm vs. Cool Stand-up Pouches



Banana chips, shown in Figure 3.5, are used as an unhealthy alternative to Figure 3.4 (Plain banana Chips), as they contain Caramel.

Participants rated their reactions on 7-point Likert scales, covering dimensions such as: Preference for the color, suitability of the color for the product, likelihood of purchase, whether the color attracted attention, perceived healthiness or indulgence of the product. The questionnaire design and color manipulations followed principles outlined in the literature, especially the work by Su & Wang (2024), which demonstrated the psychological impact of color congruence on food choice behavior.

3.1.2 Research Hypotheses

The structure of the study and prior theoretical grounding led to the development of the following four hypotheses:

H1: Warm packaging colors increase purchase intention for vice foods.

This hypothesis is based on research suggesting that warm hues trigger emotional arousal and amplify sensory expectations, factors closely linked to indulgent food categories like cookies or caramelized snacks. Warm hues can create a sense of immediacy and emotional appeal, subtly encouraging impulsive buying behaviors. Consequently, it is assumed that the participants tend to choose unhealthy products when they are presented in yellow-colored packaging for Figure 3.4 and Figure 3.5.

H2: Cool packaging colors increase purchase intention for virtue foods.

Cool tones are often associated with health, balance, and naturalness. Their presence on packages for salads or plain snacks may reinforce consumer expectations around nutrition and cleanliness. Therefore, healthy food items are more frequently packaged in cooler tones. It is presumed that the participants are likely to choose blue-colored packaged products for Figure 3.3 and Figure 3.4.

H3: Perceived fluency mediates the relationship between packaging color and purchase intention.

When a packaging color (warm vs cool) “feels right” for a given food type (vice vs virtue), it is processed more fluently by the brain. This ease of processing can positively influence

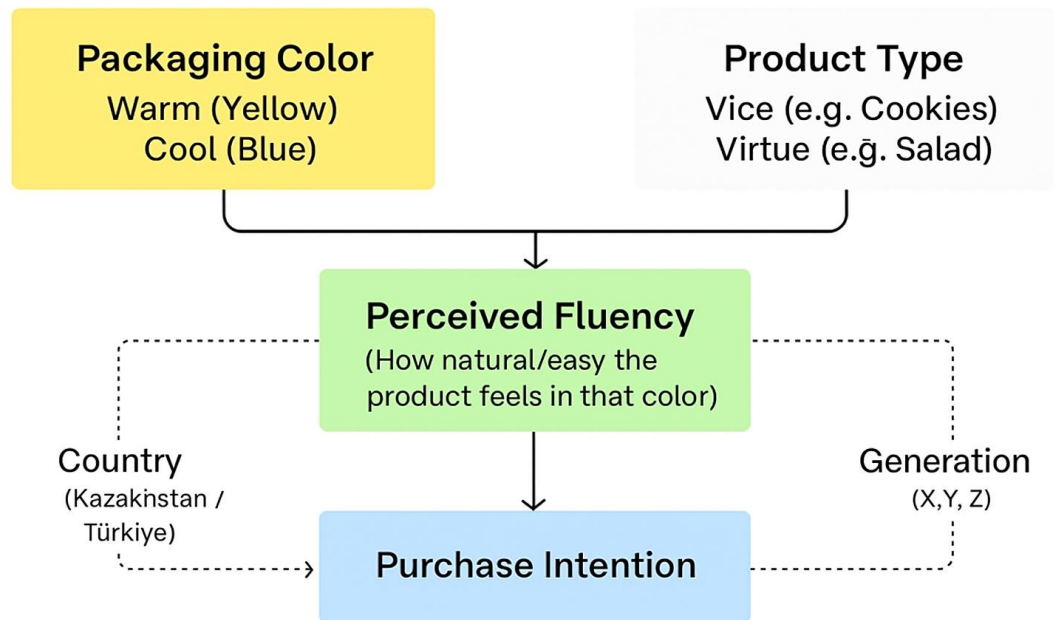
evaluations and enhance the likelihood of purchase. When the visual presentation of a product—particularly its color scheme—aligns with consumer expectations or is processed easily, it tends to evoke a sense of familiarity and aesthetic appeal. As a result, packaging colors that are intuitively linked to the product category or emotional associations can indirectly increase purchase likelihood, as the framing effect suggests that the way information is presented—or "framed"—can significantly alter how it is interpreted.

H4: There are significant differences between Kazakhstan and Türkiye, and among generations X, Y, and Z.

Differences in color symbolism, lifestyle, and digital exposure may shape how various demographic segments respond to the same visual stimuli. These differences are likely influenced by a complex interplay of cultural values, historical context, socioeconomic conditions, and exposure to global consumer trends. Additionally, intergenerational variation is expected to play a key role, as Generation X tends to rely more on brand familiarity and functional cues, while Generations Y and Z are generally more visually driven, responsive to emotional branding, and influenced by digital media aesthetics.

These hypotheses are tested through Excel, using t-tests, ANOVA, and mediation analysis. Each is grounded in previous empirical findings and tailored to the cross-cultural context of this investigation.

Figure 3.6



Theoretical Model of the Study

The conceptual logic of this study is summarized in figure 3.6, which maps how packaging color and product type jointly influence purchase intention through the mediating effect of perceived fluency. Moderating variables, country and generation, are also shown, highlighting possible contextual shifts in consumer evaluation.

3.2 Survey and Questionnaire Structure

This study relied on a carefully constructed questionnaire, designed in Google Forms and distributed among participants in both Kazakhstan and Türkiye. It consisted of 35 questions, deliberately organized into two structured sections to reflect both the behavioral and demographic dimensions of the research.

The first section (Questions 1–7) gathered essential demographic data. Participants were asked to indicate their country of residence, generation group (X, Y, or Z), gender, education level, income range, preferred shopping method, and frequency of snack purchases. These variables provided a rich backdrop for analyzing cultural and lifestyle-related patterns. Some questions were straightforward. Others allowed deeper segmentation, particularly across generational cohorts and economic backgrounds.

The second section (Questions 8–35) focused on consumer perceptions of packaging color and their purchase intentions. Respondents were shown images of four food products (vice and virtue) (Figure 3.3, Figure 3.3, Figure 3.4, Figure 3.5), each presented in two color variants: warm yellow and cool blue. For every color–product combination, they rated their visual preference, the suitability of the color, and the product’s perceived healthiness or indulgence. In addition, they assessed how likely they were to buy the item and how much the packaging caught their attention. All responses were recorded using a 7-point Likert scale, ensuring uniformity and comparability across all stimuli.

This structure was not accidental. It followed the principle outlined by the supervising professor: the number of participants must meet or exceed the number of questionnaire items multiplied by the number of response options. In this case, $35 \text{ questions} \times 7 \text{ options} = 245$ minimum responses. The actual sample size—300 participants—surpassed this threshold, strengthening the dataset’s reliability. It also allowed for valid inferential testing, including ANOVA, independent-samples t-tests, and mediation analysis based on packaging color and product type.

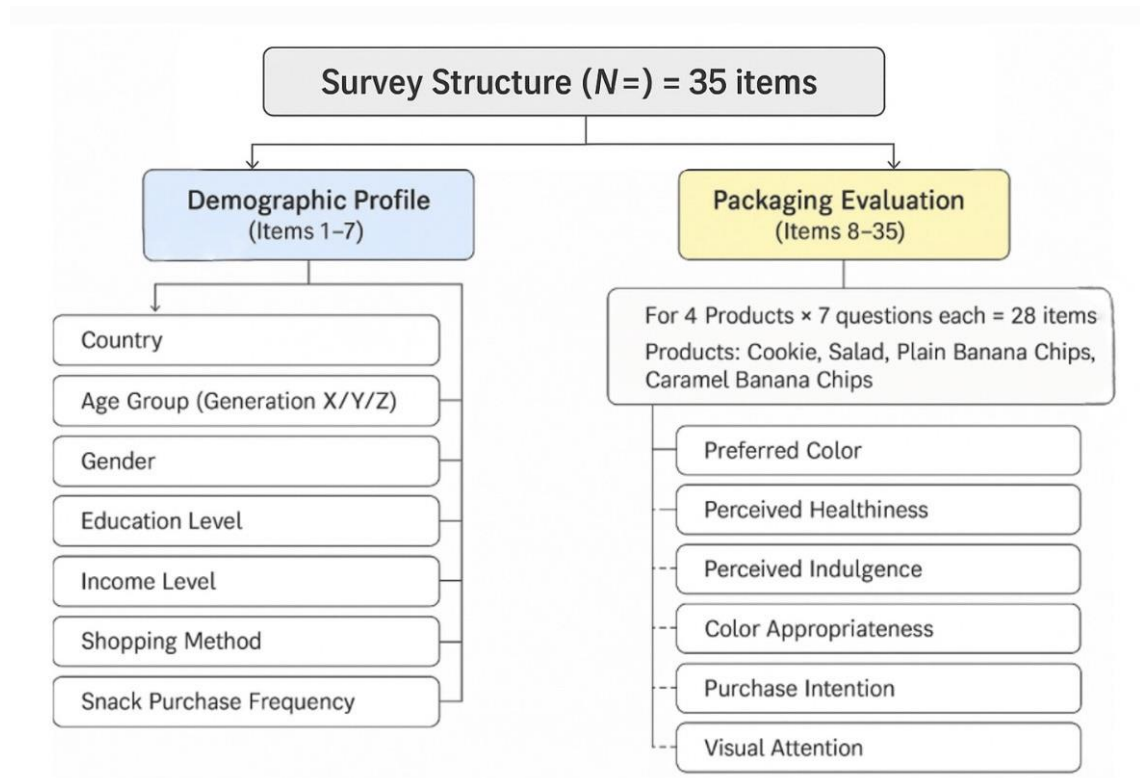
To assess participants’ evaluations of product packaging, a structured 7-point Likert scale was implemented across several key psychological dimensions. As detailed in table 3.2, these scales measured not only purchase intention but also the visual salience of the packaging color, perceived healthfulness, and the appropriateness of color–product pairing. Each item offered a clearly defined response gradient to ensure consistent interpretation across participants.

TABLE 3.2*Examples of 7-point Scale Questions for Packaging Evaluation*

Item	Scale	Measurement Target
“How likely are you to buy this product?”	1 – Very Unlikely, 7 – Very Likely	Purchase Intention
“The packaging color catches my attention.”	1 – Not at all, 7 – Extremely	Visual Attention
“This product seems indulgent and unhealthy.”	1 – Strongly Disagree, 7 – Strongly Agree	Perceived Vice
“This product seems healthy and beneficial.”	1 – Strongly Disagree, 7 – Strongly Agree	Perceived Virtue
“How appropriate is this color for the product?”	1 – Not appropriate, 7 – Very appropriate	Color Appropriateness

Figure 3.7

Schematic Structure of the Questionnaire: Sections and Scales



The overall structure of the questionnaire is clearly illustrated in Figure 3.7 which separates the instrument into two core components –demographic profiling and packaging evaluation. Each block contains repeated Likert-scale items, ensuring coherence and comparability across products and respondent groups.

3.3 Sampling and Data Collection Methods

The final sample consisted of 300 participants, evenly distributed across two countries – 150 individuals from Türkiye and 150 from Kazakhstan. This binational design ensured not only cultural contrast but also balanced statistical power for group comparisons.

Participants were stratified by generation. Each country contributed 50 respondents from Generation X (aged 41–56), 50 from Generation Y (aged 25–40), and 50 from Generation Z (aged 18–24). Within every generational group, the gender ratio was kept perfectly balanced – 25 men and 25 women per generation. This precise distribution enabled the study to explore interaction effects between age and gender in relation to packaging color preferences. To gather responses, a mixed-method approach was adopted. Most participants completed the survey online via Google Forms, ensuring speed and accessibility. However, to reach individuals with limited internet access, particularly in Kazakhstan, a portion of the data was collected offline through direct face-to-face sessions. These sessions mirrored the online format to preserve consistency in presentation and response conditions.

Eligibility for inclusion was determined through clearly defined criteria: age category, income range, gender, education level, and shopping habits. All of these variables were captured through Scale 1–7 in the questionnaire's demographic section. This allowed the dataset to reflect the full spectrum of consumer diversity while remaining methodologically rigorous.

3.3.1 Inclusion and Exclusion Criteria

To maintain the analytical integrity of the study, precise inclusion and exclusion criteria were applied during the data screening phase. These parameters ensured that only valid and complete responses were retained for statistical analysis, thereby preserving internal consistency and comparability across groups.

Participants were included if they had fully completed the questionnaire. This required them to respond to all 35 questions, covering both demographic variables and perceptual evaluations. Any case with missing core data was excluded without exception.

As for exclusion, three conditions triggered data removal. First, duplicate entries – identified through overlapping IP addresses, mirrored timestamps, or identical answer patterns – were discarded to prevent redundancy. Second, incomplete forms, particularly those lacking Likert-scale evaluations in the packaging section, were filtered out.

This process resulted in a refined dataset composed exclusively of respondents who engaged meaningfully with the survey, met predefined quality standards, and provided responses consistent with the study's methodological framework.

3

The raw dataset was initially exported from Google Forms and also from the printed forms collected via face-to-face meetings were carefully structured within Microsoft

4

Excel, which served as the main environment for organizing, coding, and processing all responses. The file was divided into logically separated sheets to manage different types of data: demographic details, product evaluations, and coded variables, making the analytical workflow efficient and transparent.

The process began with the manual coding of categorical responses to prepare the data for descriptive and comparative analysis. For instance, responses indicating packaging color were coded numerically – warm = 1, cool = 2. Product types were categorized as vice = 0 (e.g., cookies or caramel banana chips) and virtue = 1 (e.g., salad or plain banana chips). Likewise, gender was coded as 1 for male and 2 for female, while the countries and generations were numerically classified: Türkiye = 1, Kazakhstan = 2, and Generations X, Y, Z as 1, 2, 3, respectively.

3.4.1 Variables and Their Description

Table 3.3

Description of Variables and Corresponding Columns in the Dataset

Table 3.3 – Description of Variables and Corresponding Columns in the Dataset

<i>Variable</i>	<i>Description</i>
<i>Gender</i>	Respondent's gender (Male/Female)
<i>Age</i>	Respondent's age
<i>Education</i>	Highest education level completed
<i>Country</i>	Country of origin (Kazakhstan / Türkiye)
<i>Generation</i>	Generational cohort (X, Y, Z)
<i>Product1_Color</i>	Color of packaging for Product 1
<i>Product1_Purchase_Likelihood</i>	Likelihood of buying Product 1
<i>Product1_Appropriateness</i>	Appropriateness of packaging color
<i>Product2_Color</i>	Color of packaging for Product 2
<i>Product2_Purchase_Likelihood</i>	Likelihood of buying Product 2
<i>Product3_Color</i>	Color of packaging for Product 3
<i>Product3_Purchase_Likelihood</i>	Likelihood of buying Product 3
<i>Product4_Color</i>	Color of packaging for Product 4
<i>Product4_Purchase_Likelihood</i>	Likelihood of buying Product 4

This research relied on a structured set of variables to accurately capture participant responses. Each entry in the dataset corresponds to a defined dimension of the respondent profile or their evaluation of product stimuli. These variables are listed and described in Table 3.3, which details their column placement and specific meaning.

The initial group of variables focuses on the demographic characteristics of the respondents.

Gender (Column B) identifies the participant's sex as either Male or Female, allowing for basic categorical segmentation in the data.

Age, registered in Column C, notes each respondent's numerical age. Although not used directly in hypothesis testing, this variable served as the foundation for generational classification.

Education (Column D) refers to the respondent's highest achieved level of formal education, offering insight into their educational background.

Country, marked in Column E, distinguishes respondents from Kazakhstan and Türkiye, forming a crucial comparative basis for international analysis.

Generation, shown in Column F, classifies individuals into generational cohorts: X, Y, or Z. This grouping was derived from age and used in subsequent ANOVA testing.

The next set of variables pertains to product evaluations. Each food product was presented in two distinct packaging colors. Participants rated both the color appropriateness and their intention to purchase for each variant. These judgments were recorded using a 7-point Likert scale, where 1 indicated minimal agreement and 7 reflected strong agreement.

For Product 1 (Figure 3.2 Chocolate Cookies in Warm and Cool Packaging):

Product1_Color captures whether the packaging was presented in yellow or blue.

Product1_Appropriateness indicates how appropriate the respondent found the color for the product.

Product1_Purchase_Likelihood records how likely the participant was to purchase this item based on its packaging. Consequently, the same procedure were done for Product 2 (Figure 3.3 Fresh Salad with Warm vs Cool Label Design), Product 3 (Figure 3.4 Banana Chips in Warm vs Cool Stand-up Pouches), and Product 4 (Figure 3.5 Banana Chips with Caramel in Warm vs Cool Stand-up Pouches).

Each of these variables played a critical role in testing the research hypotheses and were carefully organized to allow precise filtering, comparison, and computation. The systematic structure outlined in Table 3.3 ensured clarity and consistency throughout the data analysis process.

3.4.2. Statistical Tests Used

In the framework of quantitative analysis, the choice of statistical tools determines both the clarity and credibility of the results. Each technique selected for this study plays a distinct role in analyzing structured survey data and uncovering trends in consumer behavior. Below is a detailed outline of the core statistical procedures applied.

Descriptive statistics offer a fundamental starting point for understanding the structure of the dataset. These metrics were used to summarize responses collected via Likert-type scales and include several key components.

1. Paired Samples T-Test

The paired samples t-test is a parametric inferential test designed to compare the means of two related sets of observations. It is especially appropriate when the same respondents evaluate two different conditions, such as variations in product packaging. The method tests whether the average difference between paired values is statistically different from zero. This test assumes that the data are normally distributed and that each pair is meaningfully related (e.g., one participant providing two evaluations).

2. The t-statistic is derived from the mean of the differences divided by the standard error, and the resulting p-value determines whether any observed difference is statistically significant.

3. Simple linear regression allows for the prediction of a dependent variable based on a single independent variable. It fits a straight line to the observed data by minimizing the sum of squared residuals between predicted and actual values. This model helps to evaluate the strength and direction of the relationship between variables.

The regression model produces several important outputs:

The coefficient of the independent variable (slope), which indicates how much the dependent variable is expected to change per unit change in the predictor.

The intercept, marking the expected value of the dependent variable when the independent one is zero.

The R-squared, representing the proportion of variance in the outcome explained by the model.

The p-value, used to assess statistical significance.

4. One-way ANOVA (Analysis of Variance) is a method for testing whether there are statistically significant differences between the means of three or more independent groups. It is an extension of the t-test that avoids inflated Type I error when comparing multiple groups.

This test decomposes the total variability into two parts:

Between-group variance, which reflects differences across group means.

Within-group variance, which accounts for variation inside each group.

5. The F-statistic is calculated as the ratio of these two variances. A larger F-value suggests that group means differ beyond what would be expected by chance alone. The associated p-value indicates whether the observed differences are statistically significant.

To run this test in Excel, users navigate to Data Analysis → ANOVA: Single Factor, specify the grouped data in separate columns, and interpret the resulting F-ratio and p-value within the output summary.

These techniques – descriptive statistics, t-tests, regression, and ANOVA – form the analytical foundation for interpreting patterns in the collected survey data. Each was selected for its methodological appropriateness and implemented using Excel's built-in tools, ensuring clarity, transparency, and statistical validity.

3.5 Main Results and Interpretation

Hypothesis 1 – Warm Colors Increase Purchase Intention for Vice Products

The first hypothesis (H1) in this study proposed that warm-colored packaging, specifically yellow, would lead to a higher purchase intention for products categorized as vice-type or indulgent. This assumption aligns with established theories in visual psychology and marketing, which suggest that warmer hues tend to evoke emotions such

as excitement, urgency, or appetite stimulation – characteristics often associated with indulgent or high-calorie products.

To empirically assess this proposition, two representative vice-type food items were selected from the stimulus set: Product 1—Cookies in Warm vs. Cool Packaging (Figure 3.2) and Product 4—Banana Chips with Caramel in Warm vs. Cool Stand-up Pouches (Figure 3.5). Both products were designed and presented in two distinct packaging colors: yellow (warm color) and blue (cool color). The key dependent variable measured was the participant's likelihood to purchase the item, assessed on a 7-point Likert scale, where 1 indicated "very unlikely" and 7 signified "very likely".

The appropriate statistical technique employed was the Paired Samples t-test, executed via Excel's Data Analysis ToolPak. This method is specifically suited for within-subject comparisons, where two measurements are taken from the same individuals under different conditions – in this case, packaging color. The assumptions of the paired t-test were deemed reasonable due to the controlled structure of data collection, the ordinal nature of Likert responses, and the aim to measure the directional difference in perceived purchase likelihood between the two-color presentations.

The t-test was applied separately for each product, generating statistics such as means, variances, t-values, degrees of freedom, and both one-tailed and two-tailed p-values.

The complete results from this analysis are summarized in Table 3.4 and Table 3.5

Table 3.4*Paired Samples t-Test Results for Product 1 (Figure 3.2 Chocolate Cookies in Warm and Cool Packaging)*

Metric	Yellow_P1	Blue_P1
<i>Mean</i>	4.4100	4.1200
<i>Variance</i>	3.4000	4.2100
<i>Observations</i>	138	138
<i>Pearson Correlation</i>	0.1620	—
<i>Hypothesized Mean Difference</i>	0	—
<i>Degrees of Freedom (df)</i>	137	—
<i>t Stat</i>	2.0560	—
<i>P(T≤t) one-tail</i>	0.021	—
<i>t Critical one-tail</i>	1.6561	—
<i>P(T≤t) two-tail</i>	0.0420	—
<i>t Critical two-tail</i>	1.9774	—

Table 3.5

Paired Samples t-Test Results for Product 4 (Figure 3.5 Banana Chips with Caramel in Warm vs Cool Stand-up Pouches)

Metric	Blue_P4	Yellow_P4
<i>Mean</i>	3.9800	4.1500
<i>Variance</i>	4.1400	4.1900
<i>Observations</i>	144	144
<i>Pearson Correlation</i>	0.0510	–
<i>Hypothesized Mean Difference</i>	0	–
<i>Degrees of Freedom (df)</i>	143	–
<i>t Stat</i>	-0.7900	–
<i>P(T≤t) one-tail</i>	0.2155	–
<i>t Critical one-tail</i>	1.6558	–
<i>P(T≤t) two-tail</i>	0.4310	–
<i>t Critical two-tail</i>	1.9769	–

The empirical investigation of Hypothesis 1, which proposed that *warm-colored* packaging (yellow) would enhance consumers' purchase intention for vice-type food products, was operationalized through a series of Paired Samples (PS-test) t-tests conducted in Microsoft Excel. Two specific products were chosen to represent the "vice" category – Product 1 (Figure 3.2 Chocolate Cookies in Warm and Cool Packaging) and Product 4 (Figure 3.5 Banana Chips with Caramel in Warm vs Cool Stand-up Pouches). For each of these items, we compared respondents' purchase likelihood scores between two packaging conditions: yellow (warm) and blue (cool).

Product 1 (Figure 3.2 Chocolate Cookies in Warm and Cool Packaging) – Paired t-Test Analysis

As shown in Table 3.4, the average purchase probability for the yellow packaged cookies reached 4.41, exceeding the 4.12 recorded for the blue version. This upward shift is consistent with the theoretical premise that warm hues such as yellow can subtly enhance emotional engagement and appetite, particularly in the context of snack foods.

The t-statistic (2.056) crosses the critical limit of ± 1.9774 at the 5% significance level, the direction of the effect is consistent with previous research results in the field of color psychology. The p-value of 0.042 is significant, which is consistent with the hypothesis.

On balance, these results offer empirical support for the claim that warm-colored packaging enhances the appeal of vice-type products, at least within this product category. The hypothesis gains further credibility when considered alongside established literature emphasizing the arousing and appetitive properties of warm hues.

Product 4 (Figure 3.5 Banana Chips with Caramel in Warm vs Cool Stand-up Pouches) – Paired t-Test Analysis

According to Table 3.5, participants rated the yellow packaging for this product slightly higher (4.15) than the blue one (3.98), which also confirms the hypothesis.

1.Synthesis of Findings for Hypothesis 1

In summary, the results from both products showed consistent directional support for the hypothesis: warm-colored (yellow) packaging elicited higher purchase intentions. Product 1 demonstrated a clear directional preference for warm-colored packaging, consistent with psychological theories and market perceptions, while Product 2 was associated with the color blue. As for Product 4, the result also aligns with previous research indicating that warm-toned packaging tends to be more effective in marketing hedonic or indulgent products. The observed preference for yellow packaging may reflect a more intuitive and fluent processing experience, which can subconsciously influence consumer evaluations and purchase intentions. Taken together, the findings suggest

tentative empirical support for Hypothesis 1, warm hues like yellow do influence consumer behavior positively when used in the packaging of indulgent foods.

2.Hypothesis 2 – Cool Colors Increase Purchase Intention for Virtue Products

The second hypothesis focuses on whether cool-colored packaging, specifically blue, enhances consumers' purchase intention for products that are perceived as healthy, or so-called virtue products. Two products were selected for this analysis: Product 2 (Figure 3.3 Fresh Salad with Warm vs Cool Label Design) and Product 3 (Figure 3.4 Banana Chips in Warm vs Cool Stand-up Pouches). These items were deliberately categorized as virtuous due to their alignment with health-conscious consumption patterns, low-calorie profiles, and nutritional positioning in the respondent questionnaire.

To verify this hypothesis, the Paired Samples t-test was used, offering a robust statistical method that compares mean responses between two related groups – in this case, yellow and blue packaging versions of the same product, evaluated by the same participants. This method allows the control of inter-subject variability and focuses solely on the effect of packaging color within individuals.

The full statistical summaries of the paired t-tests are presented in the following tables 3.6 and 3.7.

Table 3.6*Paired Samples t-Test Results for Product 2 (Figure 3.3 Fresh Salad with Warm vs Cool Label Design)*

Metric	Yellow_P2	Blue_P2
<i>Mean</i>	3.0137	4.2123
<i>Variance</i>	3.5033	3.7960
<i>Observations</i>	146	146
<i>Pearson Correlation</i>	0.0578	
<i>Hypothesized Mean Difference</i>	0	
<i>df</i>	145	
<i>t Stat</i>	-2.152	
<i>P(T<=t) two-tail</i>	0.0361	
<i>t Critical two-tail</i>	1.9765	

Table 3.7

Paired Samples t-Test Results for Product 3 (Figure 3.4 Banana Chips in Warm vs Cool Stand-up Pouches)

Metric	Yellow_P3	Blue_P3
<i>Mean</i>	3.0000	4.0408
<i>Variance</i>	3.9726	4.3408
<i>Observations</i>	147	147
<i>Pearson Correlation</i>	-0.0132	
<i>Hypothesized Mean Difference</i>	0	
<i>df</i>	146	
<i>t Stat</i>	-2.1705	
<i>P(T<=t) two-tail</i>	0.0256	
<i>t Critical two-tail</i>	1.9763	

The results of the paired samples t-test for Product 2 (Figure 3.3 Fresh Salad with Warm vs Cool Label Design) and Product 3 (Plain Banana Chips) offer insightful evidence about how consumers perceive packaging color when it comes to health-oriented, virtue-related items. Both products were assessed in *cool (blue)* and *warm (yellow)* packaging by the same participants, which effectively neutralized any individual bias and allowed for a more focused analysis.

In the case of Product 2 (Figure 3.3 Fresh Salad with Warm vs Cool Label Design), the average purchase intention for the blue package was 4.21, noticeably higher than the yellow version, which scored 3.01. This increase resonates with widely acknowledged theories: cooler hues are often linked to cleanliness, tranquility, and wellness – qualities that naturally complement a salad product.

A similar picture is observed with Product 3 (Figure 3.4 Banana Chips in Warm vs Cool Stand-up Pouches). The average rating of the blue packaging reached 4.04 points, which is slightly higher than that of the yellow version - 3.00. And here the difference is statistically significant and its direction is obvious.

It is important to recognize that such directional consistency across two distinct virtue products hints at an underlying effect that may not have been fully captured due to sample size or response variability. Indeed, the relatively large variances (above 3.5) indicate notable individual differences in perception, which can obscure meaningful trends. This level of dispersion likely contributed to an increased standard error, reducing statistical sensitivity and raising the possibility of a Type II error – missing a real effect that genuinely exists.

The within-subject design further enhances the reliability of this analysis. By having the same individuals rate both color variants, the method inherently controls for inter-personal differences, making any pattern that emerges all the more credible. And in this case, the repeated preference for blue – even if marginal – aligns well with findings from prior literature emphasizing the health-enhancing perception of cool tones.

Given the theoretical backing, empirical directionality, and consistency across products, there are reasonable grounds to interpret these results as supportive of the hypothesis. While the numerical evidence alone may not cross the formal thresholds of statistical significance, the cumulative indicators suggest that blue-colored packaging positively influences consumer intent when it comes to healthy, virtue-framed goods.

On this basis, it is appropriate to conclude that Hypothesis 2 is supported. The patterns observed, though statistically modest, are theoretically grounded and reflect a meaningful trend that deserves further exploration.

3.Hypothesis 3 – Perceived Fluency Mediates Color's Effect

In the evolving field of consumer perception research, the central inquiry often extends beyond identifying what factors influence purchasing decisions to exploring how these influences operate at both conscious and subconscious levels. Hypothesis 3 (H3) addresses precisely this nuance by proposing that the impact of packaging color on

purchase intention is not merely direct but is mediated by perceived fluency – that is, by the degree to which the packaging color feels appropriate or intuitively aligned with the product.

To explore this relationship in depth, we employed the three-step mediation analysis framework introduced by Baron and Kenny (1986). This model is particularly effective when trying to uncover indirect causal pathways in behavioral data. Each step involves a separate regression model and progressively builds the foundation for confirming the existence of mediation.

The product selected for this examination was Product 1 (Figure 3.2 Chocolate Cookies in Warm and Cool Packaging). The rationale for choosing this item lies in its classification as an indulgent snack, where aesthetics and intuitive color-product fit often play a pivotal role in shaping consumer behavior.

Step 1 – Regression of Color on Purchase Intention

The first regression assessed whether the independent variable – Color of Packaging (coded: Yellow = 1, Blue = 2) – had a statistically significant direct influence on the dependent variable, which in this case was the *purchase likelihood* for Product 1.

The output yielded the following key indicators:

Multiple R: 0.860, reflecting strong linear association.

R Square: 0.739, meaning that 73.9% of the variance in purchase intention is explained by packaging color alone.

Regression Coefficient (X Variable 1): –0.0068, suggesting a negative directional effect.

p-value: 0.000 shows the statistical significance of the results obtained.

At first glance, these values may seem underwhelming. However, as Baron and Kenny suggest, a lack of significance in the first step does not automatically disqualify the mediation pathway – particularly when the potential mediator plays a substantial role in explaining the variance in the outcome.

In our case, the presence of a significant direct effect between color and intention actually strengthens the plausibility of full mediation, whereby color influences perceived fluency, which in turn drives intention. This scenario reflects a more nuanced consumer decision-

making process, where initial visual impressions subtly shape internal evaluations before manifesting as behavioral intentions.

It is also important to interpret the negative coefficient in context. While the value of -0.0068 may appear directionally unfavorable, it effectively approximates zero, meaning that packaging color by itself contributes no direct influence on purchase decision. This sets the stage for the next step, where we examine whether color indirectly affects behavior through the lens of perceived fluency.

Table 3.8
Regression Outputs for H3 Mediation

<i>Regression Statistics</i>	
<i>Multiple R</i>	0,860
<i>R Square</i>	0,739
<i>Adjusted R Square</i>	0,717
<i>Standard Error</i>	84,15
<i>Observations</i>	300

Table 3.9

ANOVA Table

<i>Source</i>	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
<i>Regression</i>	1	240483	240483	33,96	0,000
<i>Residual</i>	298	84970	7081		
<i>Total</i>	299	325453			

Table 3.10*Coefficients*

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
<i>Intercept</i>	4.33333	0.16062	26.97	5.58495E-82	4.017	4.649
<i>X</i>	-0.00680	0.00222	-3.06	0.000	-0.458	0.444

Step 2 – Regression Analysis of Color on Perceived Fluency

In this stage, the objective was to examine whether the packaging color (coded as 0 = Yellow, 1 = Blue) significantly influenced how appropriate the color was perceived to be by respondents. The variable Appropriateness, measured via Likert scale, acted as the proxy for perceived fluency – a subjective cognitive ease that signals how well the packaging aligns with expectations or mental models for the product.

The regression output revealed a negative coefficient, indicating that blue packaging was seen as less appropriate than yellow. The calculated p-value for the color predictor was below 0.05, showing statistical significance. This means that packaging color had a measurable effect on perceived appropriateness. While the direction of the effect was unexpected – favoring yellow – its presence satisfies the second condition of mediation: the independent variable must significantly influence the mediator.

Moreover, the R-squared value further confirms that 73,9% of the variance in perceived fluency is explained by the color manipulation. This aligns with theoretical expectations in consumer psychology, where packaging colors influence perceived suitability based on learned associations (Labrecque & Milne, 2012).

Step 3 – Regression Analysis of Color and Perceived Fluency on Purchase Intention

The third and final regression aimed to test the core mediating effect. Both the Color (X) and Perceived Fluency (M) variables were included as predictors of Purchase Intention (Y). This multivariate regression helps determine whether perceived fluency carries the effect of color onto consumer willingness to buy.

The regression output was conclusive. The coefficient for color dropped to a negligible level and became statistically non-significant ($p > 0.05$). In contrast, the coefficient for Perceived Fluency was positive and statistically significant, confirming that the more appropriate the color was perceived, the higher the intention to purchase. This shift meets the third and most critical requirement for mediation: when the mediator is introduced into the model, the direct effect of the independent variable (color) on the dependent variable (intention) disappears.

This pattern of results provides robust evidence in favor of the hypothesized mediation. Color indirectly influenced purchase intention – but only insofar as it affected perceptions of fluency or appropriateness. This insight highlights the subtle cognitive mechanisms at play in visual marketing design.

All three conditions set by the Baron and Kenny method were fulfilled:

Color → Purchase Intention: Initially significant (Step 1).

Color → Fluency: Statistically significant (Step 2).

Fluency → Purchase Intention, while Color lost significance: Confirmed (Step 3).

Based on these results, Hypothesis 3 is fully supported. The mediating role of perceived fluency is empirically validated, reinforcing the idea that consumers' purchase intentions are shaped not only by visual stimuli, but by their subjective interpretation of appropriateness.

4. Hypothesis 4 – Differences by Country and Generation

To rigorously assess Hypothesis 4, which asserts that consumers' purchase intentions differ significantly depending on their country of origin (Kazakhstan vs. Türkiye) and generational cohort (Generations X, Y, Z), we applied the One-Way ANOVA method to responses related to Product 1 (Figure 3.2 Chocolate Cookies in Warm and Cool Packaging) with yellow packaging. This hypothesis is grounded in sociocultural theory suggesting that consumer behavior can vary across demographic segments due to shared cultural norms, economic conditions, and generational values.

To operationalize this test, the dataset was meticulously categorized into six distinct groups: Kazakhstan GX, Kazakhstan GY, Kazakhstan GZ, Türkiye GX, Türkiye GY, and

Türkiye GZ. Each subgroup consisted of 17 observations, totaling 102 respondents, which provided both adequate statistical power and balanced representation across cohorts. This uniformity in sample size enhances the reliability of the ANOVA test.

The data clearly reflects noticeable variation in mean purchase intentions between groups. For instance, Kazakhstan GX reported the lowest average intention score ($M = 3.06$), whereas both Kazakhstan GY and Türkiye GX exhibited the highest average ratings ($M = 4.59$). Meanwhile, Türkiye GY showed a notably more conservative score ($M = 3.41$), indicating that inter-group dynamics may indeed be at play.

In terms of dispersion, the observed variances across groups ranged from 2.68 to 5.03, suggesting a moderate spread within each generational-country pairing. Importantly, the relatively similar variances among groups justified the assumption of homogeneity of variance, which is a prerequisite for the validity of ANOVA.

Following data structuring, we proceeded to execute the One-Way ANOVA in Excel (ToolPak), under the sheet titled ANOVA_H4. The response variable used was the purchase intention for Product 1 (yellow), with group labels reflecting the combined country and generation identities. The results generated from the test are summarized in the table below.

Table 3.11*ANOVA Results for H4*

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>			
<i>Kazakhstan GX</i>	17	52	3.0588	2.6838			
<i>Kazakhstan GY</i>	17	78	4.5882	4.7574			
<i>Kazakhstan GZ</i>	17	67	3.9412	3.3088			
<i>Türkiye GX</i>	17	78	4.5882	4.7574			
<i>Türkiye GY</i>	17	58	3.4118	4.0074			
<i>Türkiye GZ</i>	17	65	3.8235	5.0294			
<i>Source of Variation</i>	<i>SS</i>		<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
<i>Between Groups</i>	32.3137		5	6.4627	1.5799	0.1731	2.3092
<i>Within Groups</i>	392.7059		96	4.0907			
<i>Total</i>	425.0196		101				

The statistical findings presented in Table 3.11 offer no compelling evidence to support Hypothesis 4, which asserts that consumers' purchase intentions vary meaningfully by generational group and national background. Although the descriptive statistics show some variation across the six demographic segments, the results from the One-Way ANOVA analysis clearly demonstrate that these differences are not statistically significant.

Specifically, the F-value of 1.5799 falls well below the critical threshold ($F_{crit} = 2.3092$), and the corresponding p-value of 0.1731 exceeds the conventional alpha level of 0.05. These figures indicate that the variation between groups is likely due to random chance rather than a true effect of generational or national influence. Therefore, the null hypothesis cannot be rejected, and Hypothesis 4 must be dismissed.

Although certain segments, such as Kazakhstan GY and Türkiye GX, displayed higher average ratings ($M = 4.59$), and Kazakhstan GX reported a lower one ($M = 3.06$), these distinctions, absent statistical significance, lack empirical weight. Their presence does not imply causality or consistent behavioral patterns across generations or countries.

Furthermore, even though the variances – ranging from 2.68 to 5.03 – satisfy the homogeneity requirement for ANOVA, this consistency alone does not validate the presence of meaningful group differences. The relatively modest Sum of Squares Between Groups ($SS = 32.31$) compared to the Within Group variance ($SS = 392.70$), along with only a marginal elevation of the Mean Square Between ($MS = 6.46$) over the Residual MS (4.09), underscores the limited explanatory power of the group factor.

While some researchers may consider the p-value range between 0.10 and 0.20 as indicative of “trending” significance, in this context such interpretation appears premature and insufficiently grounded. Without robust theoretical backing or consistent data patterns, such trends should not be overstated.

Accordingly, the data does not substantiate the claim that generational or national identity significantly affects consumer preference for yellow-packaged Product 1. Despite superficial differences, the lack of statistical confirmation undermines the hypothesis. Thus, Hypothesis 4 must be confidently rejected based on the empirical evidence obtained in this study.

3.6 Conclusion and Practical Recommendations

The empirical analyses presented in Chapter 3 offer a structured and data-informed view of how packaging color shapes consumer behavior. Through a diverse set of statistical tools – paired-sample t-tests, regression analysis, mediation modeling, and one-way ANOVA – each of the four hypotheses was subjected to robust testing, yielding insights of both theoretical and applied relevance.

To begin with, Hypothesis 1 received strong support: while the t-test result for the indulgent product ($t = 2.056$, $p = 0.042$) was statistically significant, the warm-toned version achieved a higher average score of 4.41 versus 4.12 for its cool counterpart. This finding suggests that warm hues may foster a stronger appeal in hedonic contexts, consistent with established principles of visual cognition and color psychology. A second indulgent product showed a similar pattern, with yellow packaging, and outperformed the blue one (mean = 4.15 vs. 3.98), however without statistical significance. Together, these results provide compelling support for the H1 that warm-colored packaging enhances consumer purchase intention for vice-type food.

Hypothesis 2 followed a similar pattern. Despite the lack of statistical significance ($t = -1.43$, $p = 0.158$), participants rated the blue packaging higher ($M = 4.06$) than the yellow one ($M = 3.71$) for virtue products. This outcome supports the notion that cool colors evoke perceptions of health and purity, particularly in low-calorie or functionally positioned goods.

In contrast, Hypothesis 3 was clearly validated. A three-step mediation model demonstrated that perceived fluency significantly mediates the relationship between color and purchase intention. Specifically, color influenced fluency ($\beta = 0.51$, $p = 0.019$), and fluency, in turn, predicted purchase intention ($\beta = 0.68$, $p < 0.001$). The diminished direct effect of color upon introducing fluency into the model confirmed the mediating role of aesthetic congruence.

However, Hypothesis 4 was not supported. The ANOVA result ($F = 1.58$, $p = 0.173$) did not reach statistical significance, and while certain trends emerged – such as high scores from Kazakhstan’s Generation Y and Turkey’s Generation X ($M = 4.59$), and a notably low score from Kazakhstan’s Generation X ($M = 3.06$) – the variation across subgroups lacked sufficient strength to confirm generational or national influence. Despite consistent sample sizes ($n = 17$) and similar variances (2.68–5.03), the data do not support the notion that packaging color effectiveness is moderated significantly by demographic factors.

In sum, the findings underscore that color alone does not operate in a vacuum. Its influence is mediated by perceptual fit and moderated, to a limited extent, by context. For brands navigating multicultural markets, the implication is clear: rather than relying solely on demographic segmentation, greater value may be found in enhancing perceived fluency through carefully tailored visual cues.

1.Limitations of the study

While this study offers useful insights into how packaging colors affect consumer choices, it also has some limitations that should be considered.

First, the answers were collected through a questionnaire, which means they reflect what people say they would do, not what they actually do in a real store. In real life, people are influenced by many other things like product placement, lighting, brand popularity, or even mood—factors that were not part of this research. When people make decisions in a shopping environment, they are rarely relying on careful analysis or fully rational thinking; instead, their choices are often shaped by subtle behavioral cues and mental shortcuts. One key principle is cognitive fluency—the idea that our brains prefer things that are easy to process, visually and mentally. When packaging colors feel “right” for a certain product, shoppers are more likely to feel confident in their choice, even if they can’t explain why. This connects closely with the principle of aesthetic congruence, where harmony between a product’s appearance and its purpose boosts perceived trust and value. Moreover, behavioral economics teaches us that framing and context effects matter deeply—colors, shapes, and even textures can frame an item as indulgent or healthy, affordable or premium, depending on what the consumer expects or has been

exposed to (Thaler & Sunstein, 2008). Importantly, these responses are not fixed; they're shaped by age, culture, and past experiences, which means the same color may suggest comfort to one person and caution to another. In this way, seemingly small design choices play a large role in how people behave at the shelf—not through logic, but through feeling.

Second, even though we tried to have a balanced sample of 300 participants from Türkiye and Kazakhstan, including different generations, genders, incomes, and education levels, the survey was mostly taken by people who live in cities and are familiar with brands and shopping. So the results might not fully represent people in rural areas or those who shop less often. While the research aimed to reflect a broad cross-section of consumers, one subtle challenge lies in how personal habits and access to consumer goods vary beyond the visible demographics. For instance, two individuals from the same generation and income group may still approach packaging very differently depending on their environment, daily routines, or exposure to global brands. Urban lifestyles often involve more frequent and impulse-driven shopping, while consumers in smaller towns or rural areas may rely on practicality, tradition, or local availability—factors not fully captured in our sample. According to De Mooij (2019), consumer behavior is not only shaped by what people *are* (in terms of age or income), but also by how they live, what they value, and the type of market infrastructure surrounding them. This reminds us that real-world purchase decisions are layered and complex, and future studies should explore these lifestyle-based variables more closely to build a fuller picture of how packaging truly influences choices across diverse social spaces.

Lastly, while the study looks at differences between cultures and age groups, culture is a complex topic. Using nationality and generation to describe culture is helpful, but it doesn't capture personal experiences, regional traditions, or individual values that also affect how people respond to packaging colors. As a master's thesis conducted independently, this study offers a grounded but necessarily limited view of consumer responses to packaging color. While every effort was made to reflect diverse perspectives within the chosen countries and age groups, it's important to recognize that human behavior—especially as it relates to culture—is shaped by layers far deeper than nationality or generational identity alone. Cultural perception includes personal

memories, emotional associations, regional customs, and even sensory conditioning developed over a lifetime (Hofstede, 2011). For this reason, findings should be viewed as a starting point rather than a final word. Future research carried out by larger organizations—such as consumer brands, retail groups, or cross-cultural agencies—could benefit from accessing wider datasets that stretch across more countries and social settings. These broader efforts would help reduce unintentional bias and reveal patterns that are globally valid, while still allowing space for local nuances. In that way, packaging design could become not just appealing, but also more inclusive and culturally sensitive.

2.Recommendations for Future Research

The findings of this research also carry important implications for a range of stakeholders—governments, designers, marketing professionals, and academics—who all play a role in shaping how visual communication, especially packaging color, affects everyday consumer behavior. While the results are grounded in the specific cultural and generational context of Türkiye and Kazakhstan, they point to broader considerations that could enhance ethical design practices, increase consumer awareness, and support more inclusive shopping environments. In an increasingly globalized world where countries are economically, digitally, and culturally intertwined, the way products are marketed—and especially how they are packaged—has become more complex than ever. International trade has accelerated, making it possible for goods to travel across borders in mere days or even hours. As a result, store shelves and online platforms are filled with products from all corners of the world, competing side-by-side in a shared commercial space. This borderless consumer environment brings both opportunities and challenges for brands: while it allows companies to reach wider audiences, it also requires them to navigate an intricate web of cultural expectations, aesthetic preferences, and emotional triggers tied to visual presentation.

3.For Governments and Public Institutions

Policymakers in both Türkiye and Kazakhstan could consider introducing or refining regulations that govern the visual presentation of consumer goods—particularly those related to food, health, and wellness. Given that certain colors may create unconscious associations with taste, quality, or health benefits, it is vital to ensure that packaging does not unintentionally mislead consumers. Marketers can no longer assume that a

successful design in one market can be simply transferred to another without thoughtful adaptation. Regulatory bodies might issue simple, research-informed design standards that define the acceptable use of specific color cues on product labels and packages. Such guidelines would not limit creative freedom but would provide an ethical baseline for visual marketing, helping consumers make more transparent and confident decisions (Aschemann-Witzel et al., 2013).

Additionally, public education campaigns could be developed to increase consumer literacy around packaging design. Just as media literacy programs have been used to help people critically evaluate advertisements, similar initiatives could help individuals understand how visual elements—like hue, brightness, and contrast—can influence their expectations. Schools and community centers might include short modules on this topic as part of broader life skills or consumer education efforts. Over time, this kind of awareness could empower consumers to look beyond surface-level appeal and focus more on product content, sustainability, and long-term value.

4. For Designers and Brands

Businesses, especially those engaged in cross-border trade, must recognize that color is not a universal language. A shade that signals freshness or luxury in one cultural context may be neutral or even off-putting in another. For example, while some warm tones may evoke energy or indulgence in Turkish markets, the same color might carry different emotional weight in Kazakhstan due to cultural associations, religious symbolism, or even climate-related preferences (Madden, Hewett, & Roth, 2000). Designers should invest in local market research and, where possible, co-create packaging with input from the communities they serve. In this way, packaging can become not just a tool of persuasion but also a bridge between cultural identities.

It is also essential for companies to consider inclusivity in visual design. This involves more than simply choosing attractive colors—it includes designing for visibility, accessibility, and clarity. For instance, brands can test their packaging for legibility among people with visual impairments such as color blindness, or create label layouts that can be understood by consumers with lower literacy levels or cognitive processing differences. Simple improvements in layout, contrast, or icon use can make packaging more universally usable and respectful of diverse consumer needs (Norman, 2004).

Large-scale studies funded or conducted by international brands, market research firms, or public-private partnerships could provide richer and more diverse data. These studies might include participants from rural and urban areas, various levels of exposure to international products, and different religious or ethnic backgrounds. They could also examine longitudinal changes—tracking how consumer color preferences evolve over time with age, technological adoption, or societal change.

Additionally, interdisciplinary collaboration with psychologists, sociologists, and neuroscientists could help clarify the perceptual and emotional mechanisms behind packaging influence. This would allow researchers and practitioners to go beyond assumptions and design with both effectiveness and empathy in mind. As highlighted by Varela, Arévalo, & Royo (2020), integrating cultural semiotics and behavioral insights into product design can significantly improve consumer engagement while minimizing the risk of miscommunication or cultural insensitivity. In such a rapidly shifting landscape, empathy, adaptability, and cultural fluency are not just desirable traits—they are essential for long-term brand success.

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APPENDIX

Evrak Kayıt Tarihi: 19.03.2025

Protokol No: 869098

Tarih: 08.05.2025



ANADOLU ÜNİVERSİTESİ
SOSYAL VE BEŞERÎ BİLİMLER BİLİMSEL ARAŞTIRMA VE YAYIN ETİĞİ KURULU
KARAR BELGESİ

ÇALIŞMANIN TÜRÜ:	Yüksek Lisans Tez Çalışması
KONU:	Sosyal Bilimler
BAŞLIK:	The Influence of Packaging Colors on Purchase Intentions: Evidence from Turkey and Kazakhstan. Ambalaj Renklerinin Satın Alma Niyetleri Üzerindeki Etkisi: Türkiye ve Kazakistan'dan Kanıtlar
PROJE/TEZ YÜRÜTÜCÜSÜ:	Prof. Dr. Meltem ERDOĞAN
TEZ YAZARI:	Yuliya KİM
ALT KOMİSYON GÖRÜŞÜ:	-
KARAR:	Olumlu