REDUCING FOOD WASTE THROUGH EXPERIMENTAL INTERVENTIONS: CONSUMER CHOICE AND RETAIL STRATEGY FOR NEAR-EXPIRY PRODUCTS

by

KEMAL BERKAY TÜZÜN

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ABSTRACT

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KEMAL BERKAY TÜZÜN

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Keywords: Near-expiry products, food waste reduction, behavioral nudges, retail operations, experimental study

This dissertation presents an experimental investigation into how retailers can encourage consumers to choose near-expiry food products—an important step toward reducing food waste and promoting sustainable retail operations. Near-expiry products, while still safe and consumable, are often avoided by consumers due to concerns over freshness and perceived quality. Through three controlled experiments, this study examines how various interventions—including nudges, brand-related signals, and bundling strategies—influence consumer decision-making in near-expiry contexts. Study 1 finds that social norm messages significantly increase the selection of near-expiry items, outperforming both financial discounts and other nudges such as self-image or quality appeals. Study 2 tests the roles of premium branding and customer loyalty but finds that neither increases selection, suggesting that expectations tied to brand image may backfire when product freshness is perceived as compromised. Study 3 evaluates bundling as an operational strategy and shows that immediate delivery options are preferred over flexible ones, especially under low discount conditions—contrary to what temporal and control-based theories would suggest. Collectively, these findings demonstrate that carefully designed, low-cost behavioral interventions can outperform traditional pricing approaches in promoting near-expiry product selection. They also reveal that some

widely accepted consumer behavior theories may not fully hold in the perishable goods setting, where concerns about simplicity, immediacy, and perceived freshness are dominant. Future research should explore the role of personalized nudging, substitution behavior between product types, and real-world testing in dynamic retail environments to further assess scalability and long-term effectiveness.

ÖZET

DENEYSEL MÜDAHALELERLE GIDA İSRAFININ AZALTILMASI: SON KULLANMA TARİHİ YAKLAŞAN ÜRÜNLER İÇİN TÜKETİCİ TERCİHİ VE PERAKENDE STRATEJİSİ

KEMAL BERKAY TÜZÜN

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Anahtar Kelimeler: Son kullanma tarihi yaklaşan ürünler, gıda israfının azaltılması, davranışsal yönlendirmeler, perakende operasyonları, deneysel çalışma

Bu tez, perakendecilerin tüketicileri son kullanma tarihi yaklaşan gıda ürünlerini tercih etmeye nasıl teşvik edebileceğine dair deneysel bir araştırma sunmaktadır; bu, gıda israfını azaltmak ve sürdürülebilir perakende operasyonlarını desteklemek için önemli bir adımdır. Son kullanma tarihi yaklaşan ürünler hâlâ güvenli ve tüketilebilir olmalarına rağmen, tazelik ve algılanan kalite konusundaki endişeler nedeniyle tüketiciler tarafından sıklıkla tercih edilmemektedir. Üç kontrollü deney aracılığıyla bu çalışma, davranışsal yönlendirmeler (nudgeler), marka ile ilgili sinyaller ve gruplama stratejileri gibi çeşitli müdahalelerin tüketici karar verme süreçlerini son kullanma tarihi yaklaşan ürünler bağlamında nasıl etkilediğini incelemektedir. Birinci çalışma, sosyal norm mesajlarının son kullanma tarihi yaklaşan ürünlerin seçimini anlamlı şekilde artırdığını, finansal indirimler ve öz-imaj ya da kaliteye yönelik diğer yönlendirmeleri geride bıraktığını ortaya koymaktadır. İkinci çalışma, premium markalaşma ve müşteri sadakatinin rolünü test etmiş ancak bunların seçimi artırmadığını bulmuştur; bu durum, ürün tazeliğinin zedelendiği algılandığında marka imajına bağlı beklentilerin ters tepki verebileceğini göstermektedir. Üçüncü çalışma ise gruplamayı operasyonel bir strateji olarak değerlendirmiş ve özellikle düşük indirim koşullarında esnek teslimat seçeneklerine kıyasla anlık teslimat seçeneklerinin tercih edildiğini göstermiştir; bu sonuç, zamanlama ve kontrol temelli teorilerin öngörülerinin aksine bir bulgudur. Toplu olarak, bu bulgular, dikkatle tasarlanmış ve düşük maliyetli davranışsal müdahalelerin, son kullanma tarihi

yaklaşan ürünlerin seçimini teşvik etmede geleneksel fiyatlandırma yaklaşımlarından daha etkili olabileceğini ortaya koymaktadır. Ayrıca, basitlik, anlık erişim ve algılanan tazelik gibi faktörlerin ön planda olduğu bozulabilir ürünler bağlamında, bazı yaygın kabul görmüş tüketici davranışı teorilerinin tam olarak geçerli olmayabileceğini göstermektedir. Gelecekteki araştırmalar, kişiselleştirilmiş yönlendirmelerin, ürünler arası ikame davranışlarının ve gerçek perakende ortamlarında yapılan testlerin, bu müdahalelerin etkinliği ve uzun vadeli sonuçları hakkında daha fazla bilgi sağlaması gerektiğini göstermektedir.

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To my dear mother, who has always stood by me,

and to my father, whose memory continues to live on.

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1. INTRODUCTION

Food waste remains one of the most pressing global challenges, with wide-ranging implications for environmental sustainability, food security, and operational efficiency. The Food and Agriculture Organization (FAO) estimates that roughly one-third of all food produced globally is wasted or lost, which is a loss around 1.3B tons yearly (FAO, 2013). Among the various points of loss along the food supply chain, retail environments are particularly critical, especially for perishable goods such as dairy, eggs, produce, and meat. One common source of waste in retail is unsold near-expiry products—items that are still safe to consume but are rejected by consumers due to concerns over freshness, quality, or safety (Chung & Li, 2013; Wilson et al., 2017). Even with significant discounts, these products often remain on shelves until disposal, creating inefficiencies not only in sustainability terms but also in inventory management and profitability.

From an operations management (OM) perspective, food waste results from mismatches between supply and demand, forecast errors, packaging constraints, and suboptimal inventory strategies (Akkaş & Gaur, 2022; Broekmeulen & van Donselaar, 2019). While much of the literature in OM has focused on upstream or supply-side improvements—such as production planning, contract design, or logistics optimization—the demand side of the equation has received less attention. Specifically, there remains a gap in understanding how behavioral interventions at the point of sale can shift consumer preferences toward near-expiry items, thereby aligning demand with existing inventory and reducing avoidable waste (Aschemann-Witzel et al., 2015; Garrone et al., 2013).

Research in consumer behavior and marketing has begun to explore this area, identifying a range of potential drivers behind consumer reluctance to purchase near-expiry products. These include perceived risk (Mieres et al., 2006), quality heuristics (Konuk, 2018), and self-image concerns (Griskevicius et al., 2010). Behavioral economics has offered further insights through the use of nudges and framing techniques, demonstrating that small

changes in how information is presented can significantly alter consumer decisions (Kahneman & Tversky, 1979; Thaler & Sunstein, 2009). However, the existing literature tends to focus on single-message effects, lacks comparative testing of multiple interventions, and often relies on attitudinal or hypothetical data rather than real or incentivized choices (Zhang et al., 2023).

Food waste is a multidimensional problem with serious environmental, economic, and social consequences. In industrialized countries, consumers are responsible for a large share of this issue—estimated at 40–50% of total household-level food waste (FAO, 2013). However, waste is not caused by consumer behavior alone. Retailers also play a significant role in shaping outcomes, especially at the end of the supply chain operations where perishables are often removed or discarded due to expiration-related concerns (Aschemann-Witzel, Jensen, et al., 2017; Quested et al., 2013). From an operations management perspective, food waste reflects inefficiencies across production, distribution, and retail (Akkaş & Gaur, 2022; Parfitt et al., 2010). Short shelf lives of perishables—such as dairy or produce—amplify the challenge, particularly when inventory planning or consumer engagement is suboptimal (Akkaş & Sahoo, 2020).

A key contributor to food waste at the retail level is the management of near-expiry inventory. In this dissertation, near-expiry products are defined as packaged food items that remain safe and edible but have only a few days remaining before their expiration date. Although these products are still suitable for consumption, they are frequently overlooked by consumers due to concerns about freshness, safety, or quality (Chung & Li, 2013; Konuk, 2015). These perceptions are shaped by heuristics and incomplete information (Collart & Interis, 2018; Wilson et al., 2017), contributing to widespread rejection of suboptimal food. Retailers typically rely on price reductions to encourage their sale, yet this strategy cuts into profit margins and is not always sufficient to shift consumer preferences.

At the same time, studies show that many consumers are motivated not only by price but also by a desire to act sustainably (Aschemann-Witzel, Giménez, et al., 2018b). This opens up new opportunities to design behavioral interventions that can help reduce waste while maintaining financial viability. A promising approach lies in nudging—subtle changes in the choice environment that influence decision-making without restricting options (Thaler & Sunstein, 2009). Nudging draws from dual-process theories of

cognition (Kahneman, 2017), which suggest that many food decisions are guided by automatic (Type 1) processes rather than reflective deliberation. Interventions like defaults, presentation order, or social norm messages can gently guide consumers toward more sustainable outcomes by targeting intuitive processes.

Nudge-based strategies such as social norms, quality signals, and self-image appeals have shown success in other domains, including energy conservation (Allcott, 2011) and towel reuse in hotels (Goldstein et al., 2008). In food contexts, nudges may reduce the need for aggressive discounting by activating intrinsic motives like environmental responsibility or social conformity (Schubert, 2017; Vandenbroele et al., 2020). Yet the efficacy of nudges also depends on how risk and value are cognitively framed. For instance, loss aversion (Kahneman & Tversky, 1979) and mental accounting (Thaler, 1985) explain why consumers are hesitant to trade freshness for savings—particularly when the discount is presented directly on the product. Social norms, particularly descriptive norms, have been shown to reliably influence a broad range of pro-environmental behaviors, including recycling, energy use, and sustainable consumption (Farrow et al., 2017).

Prior research has documented that consumer aversion to near-expired or suboptimal food significantly contributes to food waste, particularly at the retail and household levels (Aschemann-Witzel et al., 2015; Aschemann-Witzel, Jensen, et al., 2017; Zhang et al., 2023). Various interventions—including discounting, informational campaigns, and sustainability appeals—have been proposed to encourage the selection of these products. For instance, Zhang et al. (2023) demonstrate that a message emphasizing avoidance of food waste enhances purchase willingness of near-expired items through enhanced moral satisfaction, although the study focuses on a single message type without comparing alternative behavioral interventions. However, their work does not examine social norm nudges or operational mechanisms such as default settings. Moreover, much of the prior literature has remained conceptual or descriptive in nature, with limited empirical testing of nudge types side-by-side. This dissertation addresses these gaps by systematically comparing the effectiveness of diverse behavioral interventions—including social norms, quality signaling, and self-image framing—alongside pricing strategies and default options. In doing so, it provides new empirical insight into how different nudges and decision architectures influence consumer willingness to purchase near-expiry products in realistic retail settings.

In addition to nudges, brand-related cues can also affect consumer willingness to purchase near-expiry items. Brand image offers cognitive reassurance in high-risk purchase scenarios (Mieres et al., 2006; Zhang et al., 2015), serving as a proxy for unobservable quality. Premium brands in particular help mitigate perceived risk (Konuk, 2015), though their use in heavy discounting may sometimes backfire (Theotokis et al., 2012). Brand loyalty, distinct from image, reflects a consumer's internalized trust through repeated satisfactory experiences (Chaudhuri & Holbrook, 2001; Oliver, 1999). Loyal consumers may be more accepting of expiration-date-based pricing, even with minimal discounts, due to their confidence in the brand (Reichheld & Teal, 1996; Sweeney et al., 1999). Both image and loyalty operate not only through trust but also through construal level theory (Trope & Liberman, 2003), that can suggests loyal consumers may evaluate brand offers more abstractly and overlook immediate imperfections like short shelf life.

A third study for intervention is bundling—a common retail strategy where multiple products are sold together, often at a perceived discount (Bakos & Brynjolfsson, 1999). While bundling can stimulate demand and aid inventory management, it can also trigger overconsumption (Sharpe & Staelin, 2010), particularly when one or more bundle components are near-expiry or marginally desirable (Heeler et al., 2007). Bundles tend to be evaluated based on heuristics like perceived value rather than actual utility, raising the risk of food waste. The structure of the bundle (e.g., whether items are substitutable or complementary) and the timing of their delivery both shape consumer acceptance (Yin et al., 2023). Sustainable bundling strategies—such as those emphasizing shared ownership or delayed delivery—have been proposed as alternatives to reduce waste while retaining operational benefits (Iravani et al., 2024).

Operational interventions at the store level, such as extending shelf life and improving delivery logistics, can significantly reduce food waste and increase freshness for perishable items (Broekmeulen & van Donselaar, 2017). Their work demonstrates that simplifying execution and enhancing flexibility—such as through unpacking at distribution centers—can yield up to 34.8% waste reduction, reinforcing the importance of operational design in perishable product performance. Riesenegger and Hübner (2022) argue that sustainable food waste solutions must be operationally simple to implement, particularly at the store level. Similarly, van Donselaar et al. (2006) emphasize the need for tailored inventory control strategies and automated ordering systems for perishables, focusing on upstream replenishment and item classification. However, both studies

concentrate on supply-side logistics and overlook how consumers respond to such interventions. This dissertation addresses that gap by examining how consumer preferences shift in response to bundling and delivery timing, thereby connecting back-end operational strategies with front-end behavioral reactions.

This dissertation investigates how different behavioral, brand-related, and operational interventions influence consumer selection of near-expiry products. Specifically, three experimental studies test the effectiveness of behavioral nudges (Study 1), brand image and loyalty (Study 2), and bundling strategies (Study 3) in shifting consumer preferences. To the best of our knowledge, this is the first systematic investigation to evaluate a diverse set of interventions—ranging from message framing to operational configurations—in the context of near-expiry food products using experimental methods. Prior research (Aschemann-Witzel, 2018a, 2018b; Aschemann-Witzel, Jensen, et al., 2017; Zhang et al., 2023) has shown that moral or informational appeals can shape attitudes toward suboptimal foods. However, these studies often examine a single message type, do not compare nudges systematically, or rely on self-reported rather than actual behavioral data.

Study 1 addresses these gaps by experimentally testing multiple behavioral messages—including social norm, quality assurance, and self-image appeals—alongside two discount framing strategies: product-level and invoice-level (total bill) discounts. This provides a more integrated understanding of how message content and price presentation jointly affect the acceptance of near-expiry items. Study 2 examines the role of brand-related signals, building on the literature on brand image (Konuk, 2018; Theotokis et al., 2012) and loyalty (Chaudhuri & Holbrook, 2001; Oliver, 1999), to assess whether these factors can mitigate risk perceptions and reduce consumers' dependence on financial incentives. While trust and affective attachment are known to shape purchase decisions, their influence in contexts involving perceived product decline remains underexplored. Study 3 bridges behavioral research with operational considerations by testing how bundling near-expiry items with fresher products—under various discount and delivery timing conditions—affects choice. While prior bundling studies (Sharpe & Staelin, 2010; Yin et al., 2023) and perishables management research (Adenso-Díaz et al., 2017; Broekmeulen & van Donselaar, 2019; Chung, 2019; Ketzenberg & Ferguson, 2008; Wang et al., 2015) offer valuable insights, they have largely overlooked perishability and

delivery framing. This study addresses that omission by integrating immediacy and timing into the experimental design to better reflect real-world retail dynamics.

Across these studies, the dissertation aims to answer a pressing practical question: how can retailers reduce food waste from near-expiry products without relying solely on financial incentives? Our findings reveal that while higher discounts improve uptake to some extent, social norm messages consistently outperform other nudges and even steep discounts. Contrary to expectations, premium branding and customer loyalty provide limited reassurance when freshness concerns are salient. Bundling, when designed with care, can also enhance acceptance, but its effectiveness depends strongly on offer structure and delivery timing.

The remainder of this dissertation is structured as follows. Chapter 2 introduces the first experimental study, which examines the effectiveness of different message-based nudges and discount framings on the selection of near-expiry products. Chapter 3 focuses on the second study, investigating whether brand image and customer loyalty influence consumer preferences under varying discount conditions. Chapter 4 presents the third study, which explores how bundling near-expiry products with regular items—along with changes in discount levels and delivery timing—affects consumer choices. Finally, Chapter 5 offers a general discussion of the findings, outlines managerial and theoretical implications, and identifies limitations.

2. STUDY 1: NUDGING WITH MESSAGES AND FRAMING DISCOUNTS

This study investigates how various behavioral interventions—ranging from social norm cues to pricing frames—can influence consumer preferences for near-expiry food products. Despite being safe and edible, near-expiry products are often overlooked by consumers due to concerns over freshness and quality, leading to unnecessary food waste. Drawing on theories from behavioral economics and consumer psychology, we test whether nudges such as message framing, discount strategies, and default manipulation can increase the selection of near-expiry items.

The structure of the study is organized as follows: Section 2.1. presents theoretical background, Section 2.2 describes the methodology, including the experimental design, procedure, and participant details. Section 2.3 presents the results of the statistical analyses comparing treatment conditions to baseline. Section 2.4 discusses these findings in light of relevant theory, and further explores the boundary conditions through a follow-up replication using cereal as a less perishable product alternative**.**

2.1 Theoretical Background and Hypothesis Development

This section introduces our hypotheses, focusing on how various strategies can influence consumer preferences for near-expiry products. Specifically, we explore the impact of applying higher discounts, employing nudge messages provided by retailers , utilizing discount framing, and setting different defaults. These approaches aim to address

consumer hesitation and encourage the selection of near-expiry products. By examining how these factors interact with discount levels, we seek to understand their combined effects on consumer decision-making and identify effective strategies for managing near-expiry inventory.

2.1.1 The Effect of Social Norm Message

Studies on nudges show that people tend to follow their peers. They compare their social status with their peers. This situation highly influences their decisions on environmental and sustainability-related topics (Liang et al., 2023; Schubert, 2017; Zhang et al., 2023). There are experimental studies that show how normative messages can be effective in prompting people to make sustainable decisions. In households, providing information about what the neighbors are doing to save energy influenced the other households to act similarly (Allcott, 2011; Nolan et al., 2008). Similarly, in hotels, people reused the towels more often if they were provided normative information about the pro-environmental behavior of other guests (Bohner & Schlüter, 2014; Goldstein et al., 2008). A comprehensive review of empirical studies confirms that social norms—particularly descriptive norms—consistently influence a wide range of pro-environmental behaviors, operating through both intuitive and strategic mechanisms shaped by social expectations and contextual cues (Farrow et al., 2017).

In near expiry product purchase, social norm messages can leverage the bandwagon effect, where individuals align their behavior with the majority to conform to societal expectations (Czajkowski et al., 2014; do Carmo Stangherlin et al., 2018; Farrow et al., 2017). Presenting data indicating that most consumers prefer near-expiry products can create a perceived consensus, making consumers more likely to adopt similar behavior. This aligns with the theory of planned behavior, as subjective norms influence intentions to perform a specific action.

Hypothesis 1. *If a social norm message highlighting the higher preference rate among consumers for near expiry products is provided, more people will prefer near expiry products.*

2.1.2 The Effect of Quality Message

One of the main factors influencing consumer selection among food alternatives is the quality perception of the food (de Hooge et al., 2017; Grunert, 2007). This factor's influence on the decision is enhanced if the food is considered suboptimal (Aschemann-Witzel, Giménez, et al., 2018a; de Hooge et al., 2017). Near expiry products are usually perceived as suboptimal, which reduces the overall quality perception of the consumers towards them (Aschemann-Witzel, Jensen, et al., 2017; Hartmann et al., 2021; Konuk, 2015; Lee et al., 2023; Tsiros & Heilman, 2005). In order to prevent consumers from perceiving near expiry products as suboptimal, nudge messages can be helpful. Pointing out that the quality of the product is still the same as long as there is time left to expiration can make consumers prefer near expiry products. The effectiveness of such messages are shown to be effective in various studies regarding suboptimal foods (Aschemann-Witzel, de Hooge, et al., 2018; Aschemann-Witzel, Giménez, et al., 2018a; Aschemann-Witzel, Jensen, et al., 2017; Collart & Interis, 2018; Wang et al., 2015).

To address this challenge, quality-focused nudge messages can emphasize that near-expiry products retain their quality and freshness as long as they are consumed before the expiration date.. Highlighting the equivalence in quality between near-expiry and regular products may also reduce perceived risk, a critical determinant of consumer hesitation.

Hypothesis 2. *If a message emphasizing the quality and freshness of near-expiry products is provided, more people will prefer near-expiry products.*

2.1.3 The Effect of Self-Image Message

People can create an appealing self-image by making eco-friendly decisions. Becoming a pro-environmental consumer will most likely affect people developing an inspirational self-image (Schubert, 2017). Self-image can be defined as a person's willingness to work with others to benefit society as a whole (Senatore & Fiorillo, 2016). There are studies

show that intrinsic motivation and beliefs play a crucial role in pro-environmental actions (Cecere et al., 2013; van der Werff et al., 2013). These can even be more dominant than social norms and obligations in household recycling (Czajkowski et al., 2014; Hage et al., 2009). In near expiry product purchase, a message that is relevant to self-motivation can make people find near expiry food preferable.

In near expiry product purchase, self-image messages can appeal to consumers' intrinsic motivation by reinforcing their role in reducing food waste through purchasing near-expiry products. Self-determination theory suggests that such messages foster a sense of autonomy and purpose, leading to increased likelihood of action. When consumers associate their choices with positive self-perception, their willingness to prefer near-expiry items is likely to increase.

Hypothesis 3. *If a self-image-promoting message highlighting how individuals can help prevent food waste by purchasing near-expiry products is presented, more people will prefer near expiry products.*

2.1.4 The Effect of Pricing

Pricing is one of the most effective tools for fighting food waste (Aschemann-Witzel et al., 2015; Gruber et al., 2016). Pricing has been utilized to endorse substandard goods or products approaching their expiration date., which are the products considered as not in perfect condition by consumers (de Hooge et al., 2017). There are mathematical modeling studies (Adenso-Díaz et al., 2017) that show how dynamic pricing can be effective if applied to perishable products to optimize revenue and reduce waste. Research has shown that customers are unlikely to accept suboptimal foods in a supermarket setting unless they are on sale (Aschemann-Witzel, de Hooge, et al., 2017; Chang & Su, 2022; de Hooge et al., 2017; Lee et al., 2023; Tsiros & Heilman, 2005). Hence, we posit the following relationship:

Hypothesis 4. *If a higher discount is applied to near expiry products, more people will prefer near expiry products.*

2.1.5 The Effect of Discount Framing

The way a discount is framed can significantly shape how consumers perceive its value and, consequently, whether they act on it. In typical retail settings, near-expiry products are often marked down directly—an approach that, while economically sound, may inadvertently signal reduced quality. An alternative strategy is to apply the same monetary discount not to the product, but to the total invoice. This small shift in framing may carry meaningful psychological consequences.

Framing the discount at the invoice level may decouple it from the negative connotations associated with product age or imperfection. Drawing from mental accounting theory (Thaler, 1985), this approach prompts consumers to evaluate the savings in a broader financial context—one less tethered to the product's shelf-life. Additionally, loss aversion (Kahneman & Tversky, 1979) may enhance this effect: a discount on the entire bill could be interpreted as a gain at risk of being forfeited, rather than as a concession for selecting a compromised item.

Recent research on discount framing provides further insight. For example, Liu and Chiu (2015) demonstrate that consumers assign greater perceived value to promotions framed with focused discounts than to those spread across multiple items, even when the total discount is identical. Their findings highlight how semantic framing interacts with mental accounting processes to alter perceived savings. While their work focuses on bundling, it reinforces the broader point that consumers react not just to the discount amount but to how it is allocated and presented.

Complementing this view, Kim et al. (2019) explore how the type of discount—dollar-off versus percent-off—affects psychological distance. They discover that while percent-off forms encourage high-level, abstract interpretation, dollar-off discounts elicit low-level, concrete reasoning.. Although their work addresses numerical format, not invoice framing per se, the implication is clear: the way a discount is presented can shift cognitive framing. An invoice-level discount may similarly encourage a more global, positive interpretation of the offer, positioning it as a reward for the overall purchase rather than a signal of product defect.

This framing may also reduce social stigma or self-image concerns tied to selecting discounted near-expiry items. When the savings apply to the entire transaction, consumers are less likely to feel they are signaling frugality or desperation. Instead, the discount becomes part of a savvy, even sustainable choice narrative—particularly when bundled with subtle cues about waste reduction or smart shopping.

Hypothesis 5. *When equivalent monetary discounts for near-expiry products are framed as reductions to the total purchase amount rather than as product-specific price cuts, more people will prefer near expiry products.*

2.1.6 The Effect of Charging Extra for Additional Days

This hypothesis introduces a novel pricing strategy aimed at encouraging the purchase of near-expiry products by redefining consumers' reference points. Rather than positioning fresh products as the default and offering discounts to offset perceived quality concerns, this approach frames the near-expiry item as the standard option—sold at the regular price. Additional freshness, in turn, is treated as a premium feature that comes with an added cost. This subtle shift invites consumers to evaluate the trade-off not as a compromise but as an upgrade.

Psychological theories provide strong support for this pricing structure. Prospect theory (Kahneman & Tversky, 1979) explains that consumers assess outcomes relative to reference points and are more sensitive to losses than to gains. Conventional discounting strategies implicitly establish the fresh product as the default, thereby reinforcing the notion that near-expiry goods are inferior and require compensation. In contrast, charging extra for added freshness reframes the narrative: it anchors the near-expiry item as the default and positions freshness beyond that as an optional luxury—thereby inverting the typical reference frame and making the avoidance of additional cost feel like a gain.

This strategy also draws on reference dependence (Tversky & Kahneman, 1991) and the power of framing (Levin et al., 1998) Whereas discounts highlight a reduction from an assumed ideal, premium pricing emphasizes added value and shifts consumer attention away from expiration concerns. This also avoids the negative signaling often associated

with discount labels, which consumers may interpret as cues of low quality (Aschemann-Witzel, 2018b; Tsiros & Heilman, 2005).

In addition, insights from partitioned pricing research show that consumers are more sensitive to added charges than to included costs (Hossain & Morgan, 2006). Thus, charging a premium for freshness rather than discounting less fresh products may reduce perceived loss and increase the salience of the additional benefit.

When consumers are asked to consider paying for more freshness only after selecting a product, their initial decision can act as a psychological anchor. People tend to remain consistent with earlier choices to maintain a coherent self-image (Gneezy et al., 2012). This consistency bias, reinforced by self-signaling, suggests that consumers who initially choose the near-expiry product are less likely to opt into a premium add-on later.

Finally, when framed as avoiding an unnecessary premium rather than foregoing a discount, the decision to stick with the near-expiry product may become easier to rationalize (Okada, 2005). Consumers may perceive themselves as making a practical, value-conscious choice rather than sacrificing quality.

Taken together, these insights support a reframing of freshness premiums as optional upgrades rather than corrections for inferiority. This strategy allows near-expiry products to be positioned as standard, reducing stigma and reinforcing rational choice behavior.

Hypothesis 6. *If pricing strategies frame additional days to expiration as a premium—rather than offering discounts on near-expiry products—more people will prefer near expiry products.*

Hypothesis 7. *If the near expiry product is initially offered and the option to pay to extend the days to expiry is presented afterward, more people will prefer near expiry products by choosing not to pay and staying with the initial option.*

2.2 Methodology

We prepared online decision-making experiments to test our hypothesis. The research obtained ethical clearance from the Institutional Review Board (IRB) of the university that recruited the subjects. The full study design, including experimental conditions and survey materials, was pre-registered before data collection (AsPredicted: #170897, #173161, #205711, #205712).

The experimental setup involved the participants choosing between two products: Product A, a regular product offered at full price with ten days remaining until expiration, and Product B, a near-expiry product with only three days left to expiration and offered at a discounted price. This consistent product structure was maintained across all experimental conditions. What varied between conditions was the application of strategies—such as message framing, pricing manipulation, or default change—to test whether these nudges influenced participants' willingness to choose the near-expiry product.

2.2.1 Experimental Design

We implemented eight experimental conditions. One served as the base condition, three employed different nudge messages, and four involved variations in pricing and framing. In the message-based conditions, participants were presented with one of three statements: a social norm message indicating widespread consumer support for near-expiry products; a quality message affirming that product freshness remains intact until expiration; or a self-image message linking the purchase decision to personal environmental responsibility.

In the price-related conditions, we introduced variations in how price information was presented. One condition increased the discount level on the near-expiry product. Another framed the same discount as a reduction applied to the total invoice rather than

to the specific product. The final two conditions tested the effect of reversing the default pricing structure: instead of discounting the near-expiry item, the regular product was presented with a price premium for additional days of shelf life. Participants were asked whether they would be prepared to pay an additional amount to receive the fresher product after making a decision in one of these studies; in the other, the choice was framed directly..

Each message used in the message conditions was carefully crafted to reflect the targeted behavioral mechanism. The social norm message emphasized that most of the consumers are willing to purchase near-expiry products to combat food waste. The quality message assured that quality and freshness of the near expiry until expiration and the self-image message appealed to consumers' sense of environmental responsibility. The messages are shown in the Table 2.1.

Table 2.1 Experimental Message Types and Their Content

Condition	Message
Social Norm Message	82% of the consumers are willing to purchase near-expiry products to combat food waste, thereby preventing billions of tons of perfectly good food from going to waste!
Quality Message	Quality and freshness guaranteed, regardless of the time remaining until expiration!
Self-Image Message	You can combat food waste by purchasing near-expiry products and prevent perfectly good food from going to waste!

2.2.2 Procedure

Participants began by reviewing and accepting a consent form. They were then informed that they would be making a simulated shopping decision, specifically choosing between two packs of eggs. Product A was priced at 100 TL with ten days to expire, and Product B had only three days remaining and included a discount. Depending on their assigned condition, participants encountered one of the nudge messages or a variation in how the pricing information was framed.

Following the decision task, participants completed three surveys. The first included attention checks, realism assessments, and manipulation checks to evaluate whether the

experimental conditions were interpreted as intended. The second survey measured participants' environmental attitudes (Dunlap et al., 2000) The final survey collected demographic data including age, gender, and education level. All participants completed the experiment at their own pace.

2.2.3 Participants and Experimental Checks

We initially recruited 512 undergraduate students from various disciplines. Participants received bonus points for one of their courses as compensation. To ensure data integrity, we excluded individuals who either failed the attention checks or participated in more than one condition. After this filtering process, the final sample included 467 participants (42.40% female, 57.17% male, 0.43% other).

Attention checks consisted of two multiple-choice questions to assess whether participants were carefully reading the content. Those who failed these checks were excluded. To evaluate realism, participants rated the believability of the shopping scenario and their ability to imagine themselves in it using a 7-point Likert scale. Across conditions, realism scores were consistently high, ranging from 5.4 to 6.04, suggesting the participants perceived the vignette as realistic.

Manipulation checks assessed participants' perceptions of product freshness, proximity to expiration, and the presence of a significant discount. Participants rated Product A consistently higher in freshness than Product B, with the mean freshness score for Product A across all conditions ranging from 5.08 to 5.67, and for Product B from 2.88 to 3.77. A paired-samples t-test revealed a significant difference in perceived freshness between Product A and Product B, $t(466) = 22.29$, $p < .001$, 95% CI [1.91, 2.28]. On a 7-point Likert scale, Product A was rated, on average, 2.10 points fresher than Product B. In terms of perceived proximity to expiration, Product A was generally rated between 2.25 and 2.74, while Product B was rated significantly higher, between 5.57 and 6.20. A substantial difference between Product A and Product B's perceived proximity to expiration was found using a paired-samples t-test., $t(466) = –34.88$, $p < .001$, 95% CI

[–3.53, –3.16]. On a 7-point Likert scale, Product B was rated, on average, 3.34 points closer to expiry than Product A.

Participants also responded to the statement that Product B had been discounted significantly. Their ratings ranged from 5.38 to 5.84 across the conditions. In the two conditions where Product B was not discounted but instead Product A had an added premium, this item was omitted to prevent confusion.

Lastly, the analysis of the Environmental Sustainability Questionnaire (ESQ) scores showed that the average environmental attitude scores ranged from 4.47 to 4.74 across all conditions. These differences were not statistically significant, indicating balanced distribution of pre-existing environmental concern across experimental groups and supporting the validity of random assignment $F(7, 459) = 1.43, p = .192$). All the aforementioned results are presented in Table 2.2.

Table 2.2 Summary of Participant Responses Across Experimental Conditions

Condition	Base	Socialnorm Message	Quality Message	Selfimage Message	High Discount	Total Discount	Extra Charge	Extra Charge Pay
Number of Participants	61	69	50	60	63	59	49	56
Average Realism	5.77	5.64	5.78	6.04	5.65	5.82	5.4	5.64
Fresh A	5.39	5.23	5.08	5.67	5.24	5.41	5.35	5.27
Fresh B	2.98	3.25	3.16	2.88	3.13	3.34	3.43	3.77
Product A Close Expiry	2.54	2.74	2.64	2.5	2.73	2.25	2.67	2.52
Product B Close Expiry	5.84	6.07	6.2	5.92	5.87	6.14	5.57	5.71
Product B Sig. Discount	5.38	5.43	5.62	5.48	5.84	-	-	-
Average ESQ Score	4.62	4.55	4.47	4.71	4.63	4.74	4.7	4.65

In addition to these checks, we sought to explore whether participants' interpretations of freshness and expiration cues—and the effectiveness of our manipulations—might vary by product type. To this end, we conducted a follow-up study using cereal, a shelf-stable item with lower freshness sensitivity, in place of eggs. Manipulation check comparisons confirmed that the same shelf-life framing was interpreted differently across products: a

10-day remaining shelf life was perceived as relatively fresh for eggs but closer to expiry for cereal. This highlights how baseline expectations tied to product type can shape consumer perceptions. The full design and results of this additional study are presented in the discussion section.

2.3 Results

To examine the effectiveness of each experimental condition, we conducted a series of z-test for proportions comparing the selection rates of the near-expiry product (Product B) between the base condition and each of the seven treatment conditions. Our primary outcome variable was whether participants chose the near-expiry product over the regular product. Results are presented in Figure 2.1 and Table 2.3.

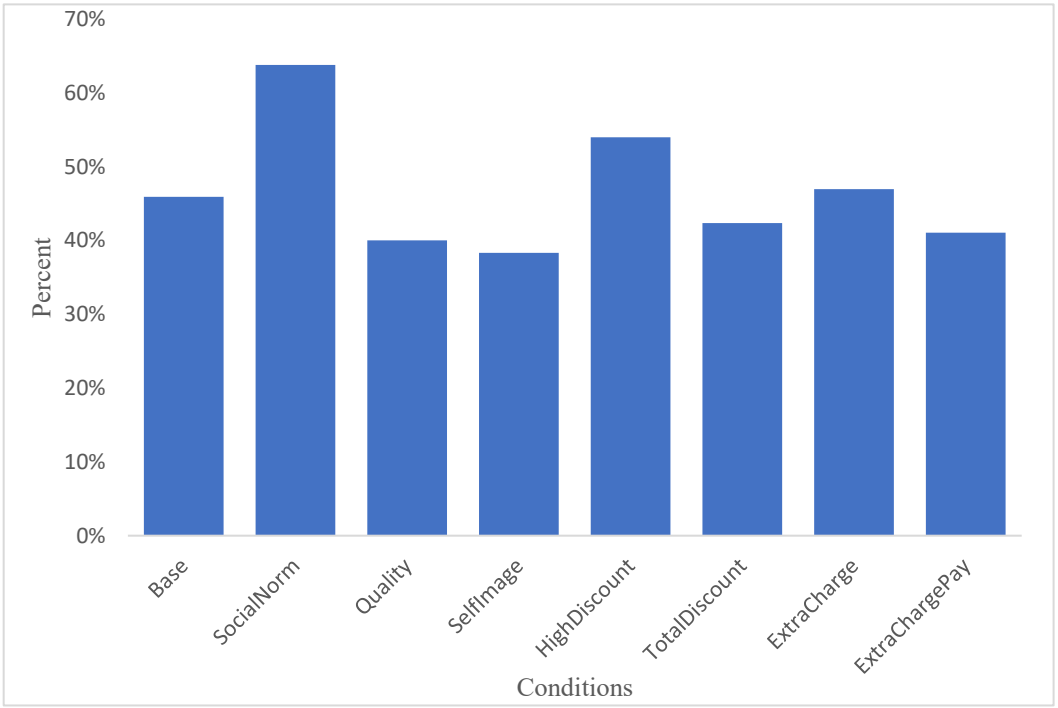

Figure 2.1. Product B Selection Percentages Across Conditions

Table 2.3 Z-Test Results Comparing Product B Selection Rates Across Experimental Conditions

Condition 1	Prod. B %	Condition 2	Prod. B %	z-value	p	H #	Support
Base	46%	Social Norm	64%	-2.045	0.041	H1	Yes
Base	46%	Quality	40%	0.624	0.532	H2	No
Base	46%	Self Image	38%	0.842	0.399	H3	No
Base	46%	High Discount	54%	-0.898	0.369	H4	No
Base	46%	Total Discount	42%	0.389	0.697	H5	No
Base	46%	Extra Charge	47%	-0.108	0.913	H6	No
Base	46%	Extra Charge Pay	41%	0.526	0.598	H7	No
High Discount	54%	Social Norm	64%	-1.144	0.252	-	-
High Discount	54%	Quality	40%	1.476	0.139	-	-
High Discount	54%	Self Image	38%	1.738	0.082	-	-
High Discount	54%	Total Discount	42%	1.280	0.200	-	-
High Discount	54%	Extra Charge	47%	0.738	0.460	-	-
High Discount	54%	Extra Charge Pay	41%	1.405	0.159	-	-

Among all interventions, the social norm message produced the strongest and only statistically significant effect. In this condition, 64% of participants selected Product B, compared to 46% in the base condition. This difference was statistically significant ($z = -2.045$, $p = 0.041$), providing support for Hypothesis 1. The result highlights the power of social influence in nudging consumers toward more sustainable choices, suggesting that making individuals aware of others' pro-environmental behavior can effectively shift preferences.

The quality message, in contrast, failed to produce a meaningful change in behavior. Only 40% of participants in this condition selected the near-expiry product, a rate slightly below the base condition. This difference was not statistically significant ($z = 0.624$, $p = 0.532$), resulting in a failure to support the Hypothesis 2. Similarly, the self-image message also underperformed expectations, with just 38% of participants selecting Product B ($z = 0.842$, $p = 0.399$). This result does not support Hypothesis 3 and suggests

that appeals to personal values or environmental identity may not be sufficiently persuasive in this context.2

In the high discount condition, 54% of participants selected Product B, which represents a modest increase over the base condition. However, this difference was also not statistically significant ($z = -0.898$, $p = 0.369$). Thus, Hypothesis 4 is not supported. These findings suggest that, at least within the range of discounts tested, price incentives alone may not be sufficient to alter consumer behavior toward near-e^{x}piry items.

The total discount framing condition—where the discount was applied to the total bill rather than the individual product—yielded a 42% selection rate for Product B. While slightly lower than the high discount condition, the difference was not statistically significant ($z = 1.280$, $p = 0.200$). The extra charge condition resulted in a 47% selection rate, also not significantly different from the high discount group ($z = 0.738$, $p = 0.460$). The extra charge pay condition, where participants were asked post-choice if they would pay for freshness, led to a 41% selection rate—again statistically indistinct from the high discount condition ($z = 1.405$, $p = 0.159$).

Though none of these contrasts reached statistical significance, comparisons between the high discount condition and other treatments offer insight into relative effectiveness. The social norm message continued to show the highest selection rate at 64%, even outperforming the high discount treatment ($z = -1.144$, $p = 0.252$), though not significantly. Self-image and quality messages both performed worse than the high discount framing (38% and 40%, respectively), with p-values approaching marginal significance ($p = 0.082$ and $p = 0.139$, respectively), suggesting potential psychological resistance or ineffectiveness.

2.4 Discussion

This study set out to investigate how behavioral interventions—ranging from message nudges to pricing frames—could influence consumer preferences for near-expiry food

products. Despite widespread concerns about freshness and perceived quality, we hypothesized that reframing the decision context could meaningfully shift consumer behavior toward more sustainable choices. The results, however, paint a nuanced picture.

Among all interventions, the social norm message stood out as the only statistically significant driver of increased near-expiry product selection. By highlighting that most consumers are already making sustainable choices, this nudge appears to have leveraged a powerful social influence mechanism. Participants were more willing to align their behavior with what they perceived others were doing. This outcome is consistent with existing literature showing that perceived social consensus can shape sustainability-related behavior (Allcott, 2011; Goldstein et al., 2008). It supports our view that people don't act in isolation—they act in context, and that context includes the behavior of others.

In contrast, the quality message and self-image message—despite being rooted in well-established behavioral theories—did not significantly change behavior. This finding raises important questions about how consumers trust and process information related to quality of the product, especially when their lifes in shelves are short. It's possible that once a product is close to expiration, no amount of reassurance can override the implicit belief that "near expiry means lower quality." Similarly, the self-image message may have fallen short because the action it promoted—choosing a less fresh product—simply didn't align closely enough with participants' internal identity narratives or felt too minor to signal environmental virtue. In this context, abstract appeals to values may be too weak to counter strong, concrete concerns about freshness.

Perhaps surprisingly, even a higher discount did not significantly increase selection of near-expiry items. Although more participants chose the discounted product than in the baseline, the difference was not large enough to be conclusive. This aligns with previous studies suggesting that while price is a factor, it is not always the decisive one when it comes to food perceived as suboptimal (Tsiros & Heilman, 2005). Consumers may interpret discounts on perishable items not as deals but as warnings.

The more subtle interventions—framing the discount at the invoice level and charging a premium for freshness—also failed to show significant effects. These conditions were designed to shift reference points and alter perceptions without explicitly labeling the near-expiry product as inferior. While these ideas are theoretically compelling,

particularly through the lens of mental accounting and reference dependence, they may have been too abstract or cognitively demanding for participants to fully process in a brief decision task. Additionally, participants may have anchored their perceptions early in the choice, and these later adjustments in framing may have come too late to meaningfully change behavior.

That said, the absence of statistical significance should not be confused with the absence of insight. The overall pattern suggests that message-based nudges, especially those that appeal to what others are doing, may hold more promise than attempts to reframe pricing in more subtle or complex ways. Participants appear more willing to adopt sustainable behaviors when doing so feels socially validated rather than when it is framed as a financial optimization or a matter of personal virtue.

These findings carry important implications for retail practice. First, supermarkets and other food retailers may consider incorporating social norm messaging into their point-of-sale communication to promote near-expiry product selection. Simply stating that many customers are already choosing these items may shift perceptions more effectively than deep discounts. Second, the relative ineffectiveness of quality and self-image messages suggests that not all pro-environmental appeals are equally persuasive. Retailers may benefit from testing message content carefully before scaling interventions. Third, the limited effect of discount-based framing reminds us that how savings are presented may not matter as much as whether consumers believe the product is worth buying in the first place.

In summary, this study illustrates both the potential and the limitations of behavioral interventions in encouraging consumers to choose near-expiry food products and, ultimately, reduce food waste. Among the seven hypotheses tested, only Hypothesis 1—based on a social norm message—was supported. Hypotheses 2 through 7, which involved quality and self-image appeals as well as various pricing and framing strategies, did not lead to significant changes in product selection. These findings suggest that even carefully designed and theoretically grounded interventions may fall short if they fail to resonate with consumers' immediate concerns or the broader decision context.

To further investigate the validity and limitations of our findings, we executed a partial replication of the experiment utilizing cereal in place of eggs. This substitution was based on theoretical considerations—cereal is a non-perishable or shelf-stable good, and thus

consumer concerns about freshness are typically less pronounced. We initially recruited 314 participants. The final sample consisted of 301 participants after 13 were eliminated from the study for failing attention-check questions or taking part in multiple conditions.(40.40% female, 58.77% male, 0.83% other).

Due to time limitations and the number of available participants, we replicated only the base condition, the three message conditions (social norm, quality, and self-image), and a pricing condition in which a higher discount was applied. The experimental design followed the same structure as the original study to ensure comparability. The number of participants in each condition and their product selections are presented in Table 2.4 and Figure 2.2.

Table 2.4 Product A and Product B Selections in Cereal-Based Experimental Conditions

Condition	Product A	Product B	Total	Product B Selection
CerealBase	26	35	61	57%
CerealSocialNorm	21	38	59	64%
CerealQuality	23	38	61	62%
CerealSelfImage	18	48	66	73%
CerealHighDiscount	19	35	54	65%

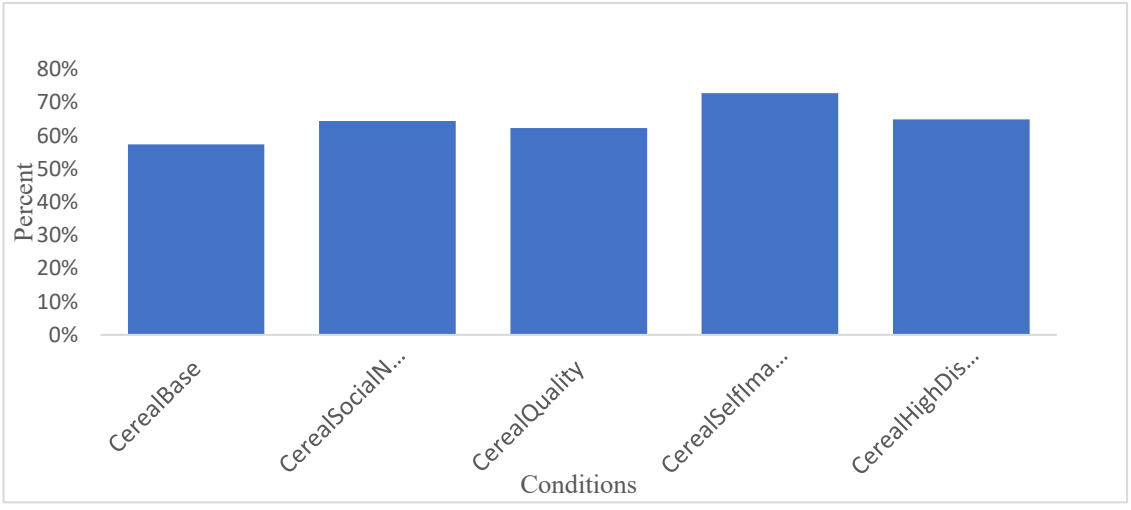

Figure 2.2. Product B Selection Percentages Across Conditions

Participants were randomly assigned to one of the five conditions. In the message conditions, the same texts used in the egg study were presented alongside the choice task, which now involved selecting between two boxes of cereal: one with a shorter shelf life

offered at a discount, and another with a longer shelf life at full price. Participants filled out the identical post-choice surveys as in the original study after completing the decision task, which included an environmental attitudes survey, realism assessments, and manipulation checks.

This replication enables us to examine whether the effectiveness of behavioral interventions is influenced by product type—specifically, whether consumers respond differently when the item is not highly perishable. Comparing the outcomes of this cereal-based replication with those of the initial egg-based experiment allows for a more nuanced understanding of how product characteristics shape the impact of nudges and pricing strategies.

Indeed, the replication with cereal revealed important differences across product types. In the base condition, 57% of participants selected the near-expiry cereal, compared to 46% in the egg base condition. Although this difference was not statistically significant ($p = 0.205$), it suggests a more favorable baseline attitude toward near-expiry cereal, likely due to lower perceived health or quality risks associated with shelf-stable goods.

Strikingly, the quality message, which had no effect in the egg study (40% selection), led to a significantly higher selection rate of 62% in the cereal study ($p = 0.019$). Similarly, the self-image message, which produced the lowest selection rate in the egg context (38%), resulted in the highest selection rate for cereal at 73%—a statistically significant difference ($p < 0.001$). These findings indicate that message-based nudges may be far more effective when applied to products where freshness concerns are reduced. In such contexts, appeals to product assurance and environmental self-perception appear to resonate more strongly with consumers.

The social norm message maintained its effectiveness across both studies, yielding an identical selection rate of 64% in each context ($p = 0.940$). This consistency supports the robustness of social influence as a mechanism for shaping sustainable consumer behavior, regardless of product type.

The high discount condition, while yielding higher selection rates in both studies (54% for eggs and 65% for cereal), did not show a statistically significant difference between the two ($p = 0.234$). The relative strength of higher discounts may be less sensitive to product type than message-based interventions. Summary of the results are presented in Table 2.5.

Table 2.5 Comparison of Product B Selection Rates Between Egg and Cereal Conditions

Egg Condition	Prod. B %	Cereal Condition	Prod. B %	z-value	p
Base	46%	Base	57%	-1.268	0.205
Social Norm	64%	Social Norm	64%	-0.075	0.940
Quality	40%	Quality	62%	-2.339	0.019
Self Image	38%	Self Image	73%	“-3.887	<0.001
High Discount	54%	High Discount	65%	-1.189	0.234

To ensure the integrity of cross-product comparisons, we conducted manipulation checks examining how freshness and expiration cues were perceived. Interestingly, although the same number of days to expiration was used across both studies, eggs were rated as significantly fresher than cereal with means 5.32 vs. 4.71, while cereal was perceived as closer to expiry with means 3.27 vs. 2.63. This suggests that the same "10 days remaining" frame may signal relative freshness for eggs but already nearing the end of shelf life for cereal—likely due to cereal’s typically longer storage expectations. Importantly, perceptions of Product B (the near-expiry item) did not differ significantly between studies, indicating that the core manipulation of near-expiry framing was interpreted consistently across product types The results are show in Table 2.6.

Table 2.6 Comparison of Perceived Freshness and Closeness to Expiry Between Egg and Cereal

Condition	Eggs	Cereal	F	p
Fresh A	5.32	4.71	36.8	0.000
Fresh B	3.08	3.03	0.144	0.704
Product A Close Expiry	2.63	3.27	20.1	0.000
Product B Close Expiry	5.97	5.92	0.278	0.598

Together, these results show that the success of behavioral interventions in promoting near-expiry product selection is shaped not only by the type of nudge but also by the nature of the product. These findings carry important implications for retailers and policymakers: designing interventions to reduce food waste should also product-specific attributes such as perishability and perceived risk.

3 . STUDY 2: ROLE OF BRAND IMAGE AND BRAND LOYALTY

In retail settings, offering price discounts on near-expiry products is a common tactic to reduce food waste and recover value. However, beyond financial incentive, consumers' willingness to accept these products can also be influenced by psychological factors—such as their trust in the brand or their emotional attachment to it. Study 2 investigates how brand image (premium vs. regular) and brand loyalty (loyal vs. apathetic) interact with discount levels to influence consumer choice of near-expiry products.

Previous research has acknowledged that offering discounts for perishables nearing expiration can affect consumer perceptions of brand quality. Notably, Theotokis et al. (2012) used a series of field and lab experiments to examine how expiration date-based pricing (EDBP) can lead to psychological contract violations and reduced brand trust—particularly among consumers that are loyal and perceive risk low in perishables. Their work is methodologically similar to ours in that it relies on experimental designs and focuses on perishables. However, while their primary interest lies in how EDBP affects brand image evaluations and consumer distrust, our study shifts the focus toward choice behavior—specifically, whether consumers will actually select near-expiry items when presented with brand text at different discount levels.

In doing so, our study adds to this literature by investigating how brand-related psychological factors—brand image and loyalty—moderate the effectiveness of pricing strategies designed to reduce food waste. Rather than evaluating post-purchase attitudes, we examine pre-purchase decision-making under realistic supermarket scenarios, reflecting the trade-offs consumers make between price, freshness, and brand-related signals. This framing positions our study at the intersection of consumer behavior, branding, and sustainable operations management, offering actionable insights for both marketers and sustainability-focused retailers.

The remainder of this chapter is structured as follows. Section 3.1 introduces the theoretical background and develops the study's hypotheses, focusing on how brand image and customer loyalty interact with discount level in shaping purchase decisions. Section 3.2 outlines the methodology, including the experimental design, the decision task presented to participants, and the data collection process. Section 3.3 presents empirical results, reporting statistical tests used to evaluate the hypotheses. Finally, Section 3.4 provides a discussion of the findings, interpreting them in light of existing literature and drawing implications for retail operations and sustainable consumption practices.

3.1 Theoretical Background and Hypothesis Development

This section presents our hypotheses, focusing on the roles of brand image and customer brand loyalty in shaping consumer preferences for near-expiry products. While conceptually distinct, brand image and brand trust are often closely related—brands with strong images tend to cultivate greater trust among consumers. As a result, both can operate through similar mechanisms, particularly in high-uncertainty contexts where product quality may be in question. In the case of near-expiry items, both a strong brand image and high customer brand loyalty may help reduce perceived risk, increase confidence in product quality, and encourage purchase. We examine how these brand-related factors interact with discount levels, highlighting their potential to increase selection of near-expiry products—even when price incentives are limited.

3.1.1 The Role of Brand Image

The brand image significantly influences consumer choices, particularly when the appeal of a product is reduced, as frequently occurs with near-expiry commodities. In such situations, consumers experience elevated uncertainty regarding product safety, freshness, and overall value. According to classic and contemporary research on perceived risk (Thakur & Srivastava, 2015; Zhang et al., 2015) consumers assess not only the potential benefits of a purchase but also its possible negative consequences—such as health risks, financial loss, and post-purchase regret. This perceived risk functions as a key inhibitor to purchase intentions, particularly in contexts involving perishables.

Perceived risk theory defines this concept as a combination of outcome uncertainty and the seriousness of potential loss (Mieres et al., 2006). When near-expiry products are considered, risk is especially salient due to the possibility of compromised freshness or quality. Consumers' responses to this uncertainty are shaped by various contextual and individual factors—including brand cues.

Premium brands, by virtue of their consistent positioning and quality track record, serve as psychological anchors that help consumers manage risk. Even when the product is closer to its expiration date, a strong brand image reassures consumers that the item remains acceptable. Konuk (2015) supports this claim, finding that trust in brand quality significantly increases consumers' willingness to purchase expiration-date-based discounted foods—even when price savings are modest. The brand essentially functions as a quality proxy in a high-risk context.

While Theotokis et al. (2012) caution that steep discounting of premium brands may violate consumers' psychological expectations—leading to a drop in perceived brand quality—we posit that in the absence of aggressive pricing cues, a strong brand image can operate as a risk-reducing mechanism. The familiarity and credibility of a premium brand can help consumers justify a near-expiry purchase by reinforcing confidence in product standards.

Hypothesis 1a. *If near-expiry products are offered by a premium brand rather than a regular brand, more people will prefer near-expiry products.*

The effect of brand image becomes even more pronounced under low discount conditions, when financial incentives alone may not be sufficient to justify the risk. In such cases, consumers rely more heavily on non-price cues—such as brand familiarity and reputation—to make sense of the offer (Dodds et al., 1991). As Konuk (2015)notes, price-conscious consumers are still influenced by brand trust when evaluating near-expiry items, and this trust becomes especially critical when the discount does not fully compensate for perceived freshness risk.

Furthermore, consumer behavior literature confirms that risk perception varies across individuals and is shaped by factors such as product type, situation, and cultural context (Finucane & Holup, 2005; Ueltschy et al., 2004). In high-uncertainty contexts—like perishable food nearing expiry—premium brand image provides the cognitive and emotional reassurance necessary to resolve ambiguity and reduce the perceived severity of negative outcomes.

Additionally, the hypotheses of Construal Level Theory (Trope & Liberman, 2003) offer a cognitive explanation for this effect. Premium brands are often construed at a higher, more abstract level—representing symbolic attributes like reliability, heritage, and quality rather than immediate functional characteristics. In situations where freshness is uncertain, this abstract representation can help consumers shift attention away from the product's concrete drawbacks (e.g., fewer days until expiration) and toward broader brand-related values. This psychological distancing allows consumers to justify purchasing near-expiry items from premium brands, especially when price-based justification is weak.

Hypothesis 1b. *When brand image is premium rather than regular, even under low discount levels, more people will prefer near-expiry products.*

3.1.2 The Role of Brand Loyalty

Brand loyalty reflects a consumer’s ongoing preference and behavioral commitment to a particular brand, developed over time through repeated satisfaction and trust. It extends

beyond routine repeat purchasing to include a deeper psychological attachment that influences decision-making across contexts (Chaudhuri & Holbrook, 2001; Oliver, 1999) Unlike brand image, which is an external perception shaped by marketing and reputation, loyalty is internally anchored in personal experience and affective trust.

This accumulated trust leads loyal consumers to feel more confident in the quality of a product, even when external signals—such as nearing expiration—might suggest risk. Loyalty reduces the need for extended information processing, allowing consumers to make quicker decisions with less cognitive effort (Alba & Hutchinson, 1987; Simon, 1957). In this sense, brand loyalty serves a risk mitigation function, providing assurance that the brand will continue to meet expectations.

According to Theotokis et al. (2012), loyal consumers may experience a stronger sense of psychological contract with the brand. If they perceive expiration-based discounts as a signal of quality deterioration, this may be interpreted as a contract violation, leading to negative brand evaluations. However, in many retail environments where expiration date based pricing is normalized or framed as socially responsible (e.g., waste reduction), loyalty may instead buffer against the perception of risk and reinforce willingness to purchase. Konuk (2015) supports this claim by emphasizing that risk-averse consumers tend to rely more heavily on trusted brands when evaluating perishable goods with dynamic pricing. This reliance suggests that loyal consumers may be more open to near-expiry items precisely because their emotional commitment to the brand reduces uncertainty and elevates confidence.

Hypothesis 2a. *When consumers are loyal to the brand rather than apathetic, more people will prefer near-expiry products.*

Loyalty also affects how consumers interpret price incentives. For loyal customers, even modest discounts may suffice to justify a near-expiry purchase, because their trust compensates for the lower economic gain. In contrast, apathetic or unfamiliar consumers may require more substantial discounts to feel comfortable with the perceived risk. As Reichheld and Teal (1996) suggests, loyal customers often assign greater value to their preferred brands, making them less price-sensitive and more inclined to continue purchasing under less-than-ideal conditions.

This notion is consistent with findings that consumers weigh perceived risk and value differently depending on their relationship with the brand (Chen & Chang, 2012;

Sweeney et al., 1999). Trust and familiarity help loyal customers maintain confidence in product quality, even when a discount is not steep enough to independently justify a purchase.

In addition, Construal Level Theory offers a complementary perspective. Loyalty reflects an abstract, high-level relationship with the brand—anchored in identity, trust, and long-term consistency. When faced with concrete concerns such as time to expiration, loyal consumers may mentally distance themselves from these immediate cues and instead rely on broader, symbolic meanings associated with the brand. This psychological abstraction makes them more willing to accept near-expiry products, especially under low discount conditions where rational economic motives are weaker.

Hypothesis 2b. *When consumers are loyal to the brand rather than apathetic, even under low discount levels, more people will prefer near-expiry products.*

3.2 Methodology

To test our hypotheses in Study 2, we developed a second set of online decision-making experiments, building on the design principles established in Study 1. This study also received approval from the Institutional Review Board (IRB) at the participating university. All components of the study—including the experimental structure and participant questionnaires—were pre-registered prior to data collection (AsPredicted: #216993). This study examines how variations in brand image, customer loyalty, and discount levels jointly influence the selection of near-expiry food products. Specifically, we explore whether trusted brands or loyal customer relationships can mitigate the aversion to purchasing items close to expiration when accompanied by high or low discounts.

3.2.1 Experimental Design

Participants were informed that they would be acting as shoppers selecting eggs from a supermarket. Each participant was randomly assigned to one of eight experimental conditions, forming two separate 2 (Brand Image: Premium vs. Regular) x 2 (Discount Level: High vs. Low) and 2 (Customer Type: Loyal vs. Apathetic) x 2 (Discount Level: High vs. Low) factorial designs. In each scenario, participants were presented with two options: Product A, a regular pack of eggs with ten days until expiration, priced at 100 TL, and Product B, a near-expiry version with three days until expiration, offered at a discounted rate. The discount was either low (35%, price: 65 TL) or high (50%, price: 50 TL), depending on the assigned condition.

To simulate real-life shopping context and elicit relevant perceptions, participants also read a brief description that framed their relationship with the brand and the brand's reputation. These descriptions varied according to their assigned Brand Image (e.g., premium vs. regular) and Customer Type (e.g., loyal vs. apathetic) and were intended to activate associations relevant to brand trust and attachment. The brand-specific text for each condition is shown in Table 3.1.

Table 3.1 Brand Description Texts Used in the Experimental Conditions

Condition	Brand Text
Premium	Eggoletto is a premium brand of eggs, sourced from free-range hens that are fed an organic diet. The eggs are carefully selected to ensure higher quality and freshness, making them a choice for those seeking a more premium option for their cooking. They are available in select stores and offer a more luxurious alternative to regular brands.
Regular	Eggoletto is a regular brand of eggs, sourced from standard farming practices. Produced in large quantities, it's commonly found on the shelf alongside many other options. With no emphasis on special features or production methods, it offers a simple, affordable choice for everyday cooking.
Loyal	Eggoletto is the brand you've trusted for years. You know you're getting exactly what you expect with every egg and carton. Over time, Eggoletto has earned its place in your kitchen as the go-to choice for everyday cooking.
Apathetic	Eggoletto is a brand of eggs that you might have purchased occasionally or not at all. As you don't have any history with the brand, you have no specific expectations, as it's just another option available alongside others for everyday cooking

3.2.2. Procedure

After providing informed consent, participants completed the decision task based on their assigned experimental condition. Following their choice, participants were asked to complete three separate surveys. The first assessed attentiveness and included manipulation and realism checks. The second survey measured environmental attitudes using the survey (Dunlap et al., 2000). The third and final survey collected demographic data, such as age, gender, and educational background. As in Study 1, participants received bonus course credit for their participation.

3.2.3 Participants and Experimental Checks

A total of 406 undergraduate students from various academic backgrounds participated in the study. After excluding those who failed the attention checks or participated in multiple conditions, the final sample comprised 386 participants (45.60% female, 53.63% male, 0.77% other). Participants were not subject to time limits and completed the experiment individually online.

To assess the realism of the decision scenario, participants were asked whether they could imagine themselves in such a situation and whether the shopping context was believable. These questions were measured using a 7-point Likert scale. Manipulation checks focused on the perceived freshness and discount level of each product. Participants evaluated statements such as "Product A is fresh" or "Product B's expiry date is very close" using the same scale. The statement "Product B is a product whose price has been discounted significantly" was used to assess perceived discount level.

We measured pro-environmental attitudes using 15 items rated on a 7-point Likert scale. These items addressed participants' views on natural resource use and the role of humans in environmental degradation or protection. Mean scores were calculated for each participant.

To confirm the effectiveness of the discount manipulation, we compared responses to the discount perception item across the high and low discount conditions. In high discount conditions, perceived discount scores ranged from 6.08 to 6.34, indicating strong recognition (see Table 3.2).

Table 3.2 Perceived Discount Strength of Product B Across Conditions

Condition	Apathetic & High Discount	Loyal & High Discount	Premium & High Discount	Regular & High Discount	Apathetic & Low Discount	Loyal & Low Discount	Premium & Low Discount	Regular & Low Discount
Product B Sig. Discount	6.17	6.08	6.22	6.34	5.53	5.25	5.37	5.66

In contrast, low discount conditions produced significantly lower scores, ranging from 5.25 to 5.66. A one-way ANOVA confirmed this difference was statistically significant ($F = 41.43$, $p < .001$). The consistency of responses across different brand and customer types confirms the uniform success of the manipulation, allowing us to attribute any behavioral differences observed to the experimental treatments rather than inconsistent discount recognition (3.2).

In addition to confirming the discount manipulation, we analyzed participants' realism ratings and their perceptions of freshness and expiry. Realism scores remained consistently high across all eight conditions, with averages ranging from 5.75 to 6.08. This suggests that the experimental setting was perceived as believable and engaging across different brand and customer loyalty framings.

Participants reliably distinguished between Product A and Product B in terms of freshness. Product A was rated significantly fresher than Product B, with mean freshness scores for Product A ranging from 5.26 to 5.64, while Product B scores ranged from 2.67 to 3.35. A paired-samples t-test revealed a significant difference in perceived freshness between Product A and Product B in the Brand Study, $t(385) = 25.56$, $p < .001$, 95% CI [2.32, 2.71]. On a 7-point Likert scale, Product A was rated, on average, 2.51 points fresher than Product B.

Perceptions of expiry closeness further supported this pattern. Product A was consistently rated as far from expiring, with average scores between 2.23 and 2.85. In contrast, Product B was viewed as close to expiry, receiving scores between 5.58 and 6.06. A paired-samples t-test revealed a significant difference in perceived closeness to expiry between Product A and Product B in the Brand Study, $t(385) = –29.40$, $p < .001$, 95% CI [–3.61, –3.16]. On a 7-point Likert scale, Product B was rated, on average, 3.39 points closer to expiry than Product A.

Lastly, average environmental sustainability scores (ESQ) were stable across all experimental conditions, ranging from 4.71 to 4.99. The absence of significant differences in ESQ scores suggests that baseline attitudes toward environmental responsibility were evenly distributed, reinforcing the robustness of the random assignment ($F(7, 378) = 1.46$, $p = .181$). Summary of the results are presented in Table 3.3.

Table 3.3 Summary of Participant Responses Across Experimental Conditions

Condition	Apathetic & High Discount	Apathetic & Low Discount	Loyal & High Discount	Loyal & Low Discount	Premium & High Discount	Premium & Low Discount	Regular & High Discount	Regular & Low Discount
Number of Participants	48	49	48	48	50	49	47	47
Average Realism	5.95	6.08	5.85	5.75	5.88	5.94	6.02	6.03
Fresh A	5.48	5.63	5.38	5.58	5.64	5.57	5.26	5.49
Fresh B	2.9	2.9	2.67	3.35	3.2	3.08	3	2.83
Product A Close Expiry	2.65	2.31	2.29	2.85	2.54	2.49	2.23	2.74
Product B Close Expiry	5.75	5.98	6.02	5.58	60.4	5.9	6.06	5.85
Average ESQ Score	4.95	4.9	4.96	4.71	4.99	4.93	4.88	4.92

3.3 Results

We performed z-test for proportions between brand image and loyalty conditions separately for two discount conditions to determine if a significant difference existed in the number of participants selecting near-expiry products.

3.3.1 The Role of Brand Image

The results from the z-test for proportions provide valuable insights, though they do not support our initial hypotheses. Hypothesis 1a, which proposed that premium branding would lead to higher selection rates of near-expiry products compared to regular brands, was not supported. On the contrary, under high discount conditions, near-expiry products were selected more frequently when associated with a regular brand ($\chi^2(1) = 7.6838$, $p = 0.0056$). Specifically, Product B—the near-expiry item—was chosen 32 times in the regular brand condition compared to only 20 times in the premium brand condition. This finding runs counter to our theoretical expectation that the reputation and perceived quality of premium brands would provide consumers with enough reassurance to select near-expiry items more readily (see Figure 3.1 and Table 3.4).

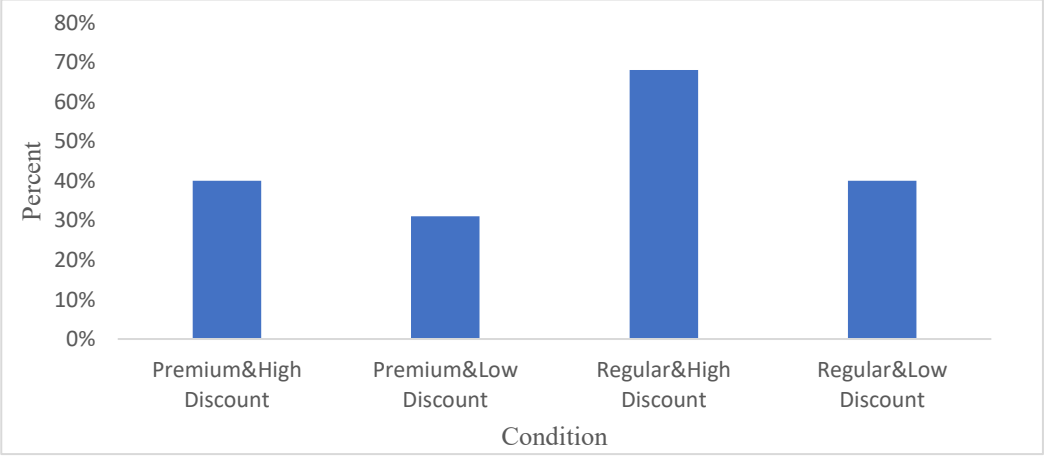

Figure 3.1 Product B Selection Percentages Across Conditions

Table 3.4 Z-Test Results Comparing Product B Selection Rates Across Brand Image Conditions

Condition 1	Prod. B %	Condition 2	Prod. B %	z-value	p	H #	Support
Premium&High Discount	40%	Regular&High Discount	68%	-2.771	0.006	H1a	No
Premium&Low Discount	31%	Regular&Low Discount	40%	-1.004	0.315	H1a	No
Premium&High Discount	40%	Premium&Low Discount	31%	0.977	0.329	H1b	No
Regular&High Discount	68%	Regular&Low Discount	40%	2.691	0.007	-	-

Instead, the results suggest a surprising reversal: consumers may actually be more willing to accept near-expiry products from regular brands when the price discount is substantial. One plausible interpretation is that expectations for premium brands are higher, and the presence of an expiry-related flaw (i.e., short shelf life) may be viewed as inconsistent with the premium positioning. In other words, a near-expiry premium product may create a sense of dissonance for the consumer, undermining the trust they typically associate with the brand. In contrast, regular brands may be evaluated with more flexible standards, and a high discount may be perceived as a compelling deal despite the freshness compromise.

Hypothesis 1b, which posited that premium branding would reduce consumers' sensitivity to discount levels, was similarly unsupported. In fact, the within-brand comparisons tell a different story. In the premium brand condition, the selection of near-expiry products did not significantly differ between high and low discount levels ($\chi^2(1) = 0.9542$, $p = 0.3286$), suggesting that consumers were not especially responsive to discounts when judging premium near-expiry items—perhaps because the mere presence of a short shelf life already detracted from the premium experience. For regular brands, however, the discount mattered significantly ($\chi^2(1) = 7.244$, $p = 0.0071$), with far more participants selecting the near-expiry product when a high discount was offered. This supports the idea that discounts play a more dominant role for lower-trust brands, but also underscores that premium branding alone is insufficient to overcome quality concerns related to expiry.

Taken together, these findings challenge the assumption that premium brand equity serves as a universal buffer in contexts involving product imperfections such as nearing expiration. Rather than mitigating risk, a premium label on a near-expiry product may in fact highlight the compromise, increasing consumer hesitation. The results suggest that consumers hold premium brands to higher standards and may be less tolerant of perceived quality lapses—even when paired with financial incentives. This may indicate a fragility in brand trust when product conditions deviate from expectations, especially in sensitive categories like perishables.

To test whether the impact of discount on near-expiry product selection varied by brand image, a logistic regression including a Brand × Discount interaction term was estimated. The interaction was not statistically significant (b = 0.42, SE = 0.47, z = 0.89, p = .373), suggesting that the difference in discount responsiveness between regular and premium brands was not sufficient to support a statistically meaningful interaction effect. While main effects indicated that discounts generally increased selection likelihood, the model did not support the conclusion that brand image altered this effect (see Figure 3.2).

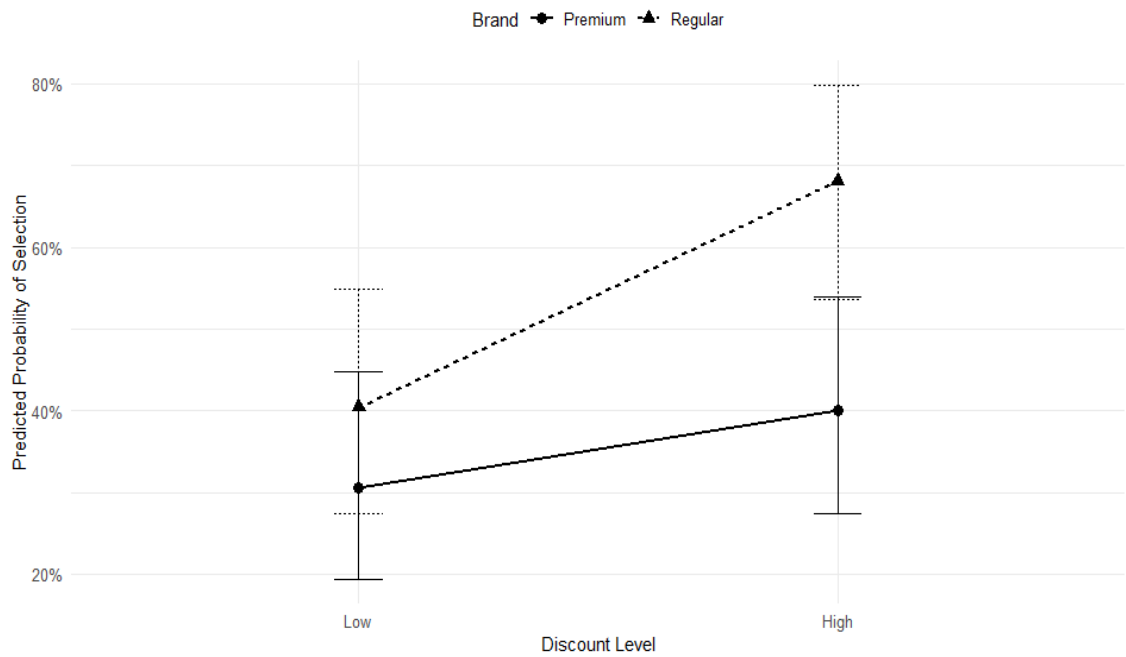

Figure 3.2. Predicted Probabilities Across Brand Image and Discount Conditions

The selection rate increased from 40% to 68% for regular brands under high discount, while the increase for premium brands was more modest (31% to 40%). This pattern may imply that regular brands benefit more from aggressive discounting than premium brands; however, given the lack of statistical significance in the interaction term, such

differences should be interpreted cautiously. The results suggest that while brand image influences baseline perceptions, its moderating role on discount effectiveness in this context was not statistically robust.

3.3.2 The Role of Brand Loyalty

The results of the z-test for proportions do not support Hypotheses 2a and 2b, which posited that brand loyalty would influence the relationship between discount levels and the selection of near-expiry products. According to H2a, loyal customers were expected to show higher selection rates of near-expiry items than apathetic customers. However, the data reveals no significant differences between the two groups. For instance, under high discount conditions, near-expiry product selection was nearly identical between loyal (48%) and apathetic consumers (50%), resulting in a non-significant difference ($z = -0.204$, $p = 0.838$). Similarly, under low discount conditions, loyal customers selected the near-expiry item 48% of the time, compared to 31% for apathetic customers—a difference that, while somewhat larger in magnitude, still failed to reach statistical significance ($z = 1.543$, $p = 0.122$). The results are presented in Figure 3.3 and Table 3.5).

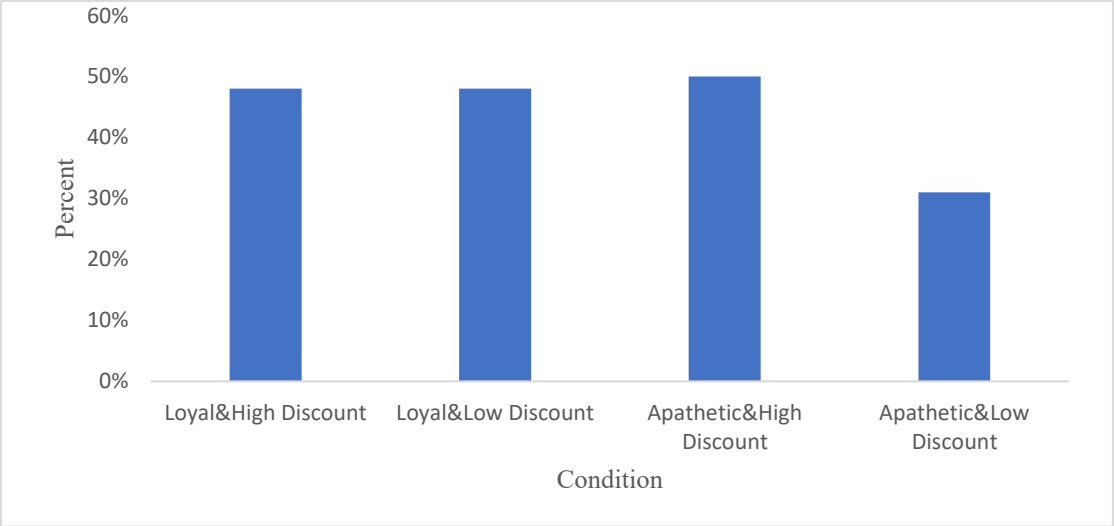

Figure 3.3 Product B Selection Percentages Across Conditions

Table 3.5 Z-Test Results Comparing Product B Selection Rates Across Brand Loyalty Conditions

Condition 1	Prod. B %	Condition 2	Prod. B %	z-value	p	H #	Support
Loyal&High Discount	48%	Apathetic&High Discount	50%	-0.204	0.838	H2a	No
Loyal&Low Discount	48%	Apathetic&Low Discount	31%	1.543	0.122	H2a	No
Loyal&High Discount	48%	Loyal&Low Discount	48%	0.204	0.837	H2b	No
Apathetic&High Discount	50%	Apathetic&Low Discount	31%	1.947	0.051	-	-

Hypothesis 2b suggested that loyal customers would be less sensitive to discount levels, while apathetic customers would rely more heavily on price incentives to accept near-expiry products. However, no significant difference was found when comparing loyal customers' selection rates across high and low discount scenarios (both 48%), resulting in a non-significant z-value ($z = 0.204$, $p = 0.837$), suggesting that discount level had minimal influence on their choices.

Interestingly, in the apathetic group, the selection rate of near-expiry items increased from 31% (low discount) to 50% (high discount)—a shift that approached statistical significance ($z = 1.947$, $p = 0.051$). Although this does not meet the conventional threshold, the pattern suggests that discount levels may matter more for consumers without a strong emotional connection to the brand.

One interpretation of these null results is that the salience of the expiration risk may have outweighed the psychological security typically associated with brand loyalty. Even among loyal customers, the proximity of expiration may have acted as a strong quality signal that disrupted habitual or emotionally driven decision patterns. The expected protective role of loyalty may not have been robust enough to counter the freshness concerns inherent in this product category.

A logistic regression was conducted to examine whether the effect of discount level on near-expiry product selection varied by consumer loyalty status. The relationship between discount and loyalty was statistically notsignificant ($b = -0.73$, $SE = 0.59$, $z = -1.25$, $p = .212$), indicating that the difference in discount responsiveness between loyal and apathetic consumers was not large enough to reach statistical significance. Although both loyal and apathetic consumers showed higher selection rates under high discount

conditions, the model suggests that the pattern was not robust enough to confirm an interaction effect.

As shown in Figure 3.4, the predicted probability of selecting Product B increased for both groups under high discount, with a steeper increase observed among apathetic consumers. Specifically, the selection rate rose from 42% to 71% for apathetic consumers, compared to an increase from 56% to 68% for loyal consumers. While this visual trend suggests that apathetic consumers may be more price-sensitive, the non-significant interaction implies that the observed difference could be due to random variation rather than a reliable behavioral pattern.

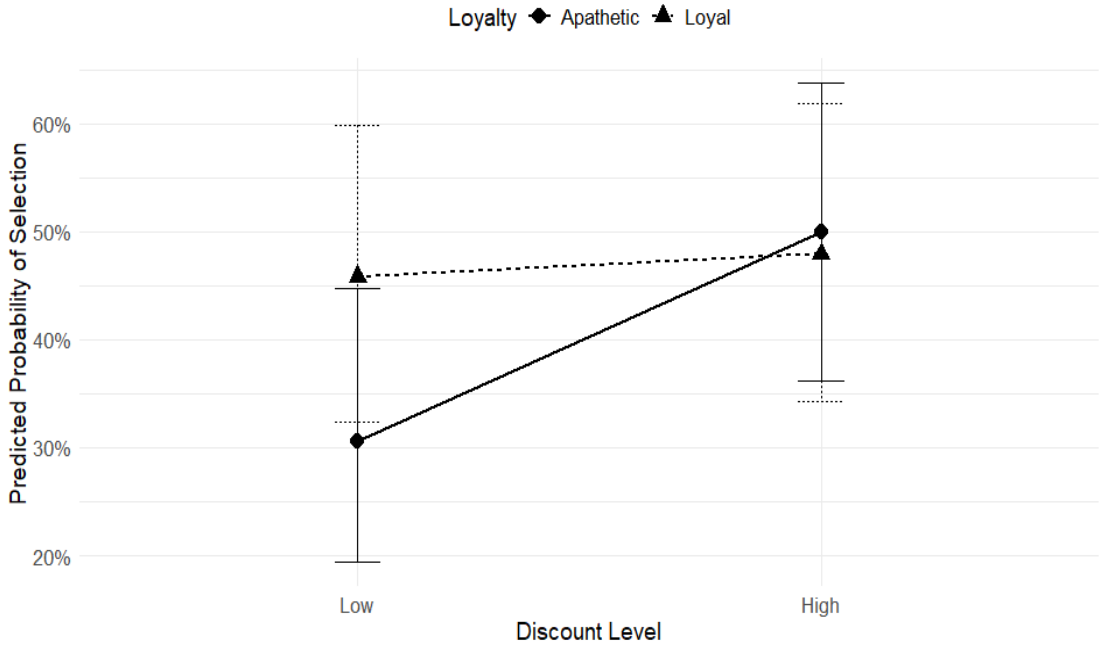

Figure 3.4. Predicted Probabilities Across Brand Loyalty and Discount Conditions

Another possibility is that the operationalization of loyalty in the study—whether self-reported or inferred—may not have captured the depth of emotional or behavioral commitment needed to activate the predicted effects. Loyalty is a multifaceted construct, and its impact may be more pronounced in other contexts where the brand-consumer relationship is stronger or more identity-relevant.

3.4 Discussion

The findings from this study challenge prevailing assumptions about the effectiveness of brand image and customer loyalty in influencing consumer acceptance of near-expiry products. While prior research suggests that trusted brands and loyal customer relationships can reduce perceived risk and promote sustainable consumption behaviors, our results indicate that such brand-related cues may have limited influence in the presence of objective product concerns, such as a shortened shelf life.

Contrary to Hypothesis 1a, participants did not prefer near-expiry products more when they were offered by a premium brand. On the contrary, under high discount conditions, near-expiry products were selected significantly more often when associated with a regular brand. This result suggests that the premium brand label may have heightened expectations for product quality, making the presence of a near-expiry attribute feel more dissonant or inconsistent with the brand's usual positioning. Rather than offering reassurance, the premium label may have drawn greater attention to the mismatch between expected and actual product conditions. In contrast, regular brands may have benefited from more moderate expectations, allowing the discount to be interpreted as a reasonable and compelling trade-off.

Similarly, Hypothesis 1b, which anticipated that premium branding would interact with discount levels to increase near-expiry product selection even under low discount conditions, was not supported. Selection rates did not significantly change between discount levels for premium brands, whereas regular brands showed a stronger response to increased discount magnitude. This pattern suggests that discount-based incentives are more influential when consumer expectations are not strongly shaped by brand prestige. In the case of premium brands, the quality signal may have made the discount less salient or less convincing in compensating for perceived product limitations.

Turning to customer loyalty, Hypothesis 2a was also not supported. Loyal customers did not show higher preference for near-expiry products compared to apathetic customers. This finding suggests that, in the presence of visible product compromises, even consumers who typically trust and favor a brand may become more cautious. The

salience of expiration-related information appears to override more abstract, affective bonds, such as trust or familiarity.

Hypothesis 2b, which proposed that loyal customers would be less responsive to discount levels than apathetic customers, was similarly not supported. Selection rates among loyal customers remained relatively stable regardless of the discount offered, whereas apathetic customers showed a notable increase in selection when the discount level was higher. This suggests that pricing strategies are more effective in influencing consumers without pre-existing brand attachment. For loyal consumers, the decision appears to be less driven by financial considerations—but also not significantly more favorable overall.

These findings point to a broader insight: when consumers are faced with perceptual signals of risk—such as a near expiration date—functional attributes such as discount size and perceived freshness appear to carry more weight than symbolic brand associations. While brand image and loyalty are often positioned as powerful tools for shaping behavior, their effectiveness seems to diminish when product attributes introduce uncertainty or concern. In particular, premium brands may be held to stricter standards, and even small deviations from expected quality may become more salient. Similarly, customer loyalty does not appear to guarantee selection when freshness is perceived to be compromised.

The observed interaction patterns between discount level and brand image or loyalty further emphasize the importance of contextualizing branding strategies. Consumers do not respond to branding cues in isolation; rather, their decisions are shaped by the interplay between emotional associations and practical considerations

In sum, this study provides important evidence that even trusted brands and loyal customer relationships may not be sufficient to overcome the perceived limitations of near-expiry products. Consumers appear to prioritize value and product integrity over symbolic attributes when faced with visible signs of compromise. These findings underscore the need for branding and pricing strategies that are closely aligned with product conditions and consumer expectations. Future efforts to promote sustainable consumption of near-expiry products should carefully consider how consumers integrate both psychological and functional cues in their decision-making process.

4. STUDY 3: BUNDLING AND DELIVERY TIME

As retailers seek innovative ways to reduce waste and manage perishable inventory, bundling strategies have gained traction as a practical and economically viable solution. A bundle is a marketing strategy where two or more products are sold as a single, integrated package, frequently at a lower cost than if the products were bought separately.. In the context of perishable goods, this strategy can be used to pair a near-expiry item with a fresh or non-expiring product in order to increase perceived value and shift consumer attention away from concerns over limited shelf life. However, the effectiveness of such bundling depends not only on the economic value offered but also on how the offer is framed—especially with regard to pricing and delivery timing.

Operational interventions at the store level—such as extending shelf life or improving delivery logistics—can significantly reduce food waste and enhance product freshness for perishable items (Broekmeulen & van Donselaar, 2019). Their empirical analysis demonstrates that simplifying execution and increasing flexibility, for instance through unpacking at distribution centers, can reduce waste by up to 34.8%, underscoring the critical role of operational design in retail performance. However, while their focus is on upstream improvements in replenishment and store execution, they do not examine how such operational changes affect consumer choice. This dissertation addresses that gap by investigating how consumers respond to bundled product offers that vary in discount levels and delivery timing—linking operational strategies with behavioral outcomes in the context of near-expiry food management.

Study 3 examines how these framing decisions influence consumer preferences when near-expiry items are bundled with regular products. Specifically, the study focuses on two core factors: the level of discount applied to the bundle and whether the fresh component can be delivered immediately or flexibly at a later date. The aim is to explore

how consumers navigate trade-offs between price, product freshness, and consumption control in evaluating bundled offers. The study draws on key theoretical frameworks—such as perceived risk theory, mental accounting, and temporal construal theory—to develop two hypotheses regarding the behavioral mechanisms behind bundle selection.

The remainder of this chapter proceeds as follows. Section 4.1 introduces the theoretical background and develops the study's hypotheses, focusing on how consumers psychologically process discount incentives and delivery options. Section 4.2 outlines the methodology, including the experimental design, the decision task presented to participants, and the data collection process. Section 4.3 presents the empirical results, reporting statistical tests used to evaluate the hypotheses. Finally, Section 4.4 provides a discussion of the findings, interpreting them in light of existing literature and drawing implications for retail operations and sustainable consumption practices.

4.1 Theoretical Background and Hypothesis Development

In retail operations, bundling strategies are often used to increase perceived value and manage inventory, particularly when products have a limited shelf life. A common challenge for retailers is how to effectively promote near-expiry items without compromising consumer trust or perceived product quality. One emerging solution is to bundle such products with regular, non-expiring items and offer them at a discounted price. However, consumer uptake of these bundles depends heavily on how the offer is framed—especially in terms of pricing and delivery flexibility.

From an operations management perspective, the inclusion of a near-expiry item introduces perceived risk into the decision. Consumers may worry about limited usability or freshness, which can deter them from making the purchase. A near-expiry item signals higher risk, but this risk can be offset when the price is lowered substantially. From this perspective, a higher discount functions as a risk compensation mechanism—an operational lever that makes a less desirable product more acceptable.

Additionally, mental accounting theory (Thaler, 1985) provides a behavioral explanation for this process. Consumers tend to mentally separate the components of a bundle, weighing the cost of the expiring item against the perceived savings from the discount. A steep discount allows them to reframe the transaction as a good deal, compensating for the reduced shelf life of one item. From this lens, consumers are more likely to choose the bundle if the overall offer appears economically efficient. Supporting this, Johnson et al. (1999) argue that bundles are evaluated more positively than individual items because the single stated price simplifies cognitive processing and helps justify the purchase as a unified decision rather than as multiple separate ones.

The framing of price discounts also plays a critical role in consumer evaluation of bundles. Drawing from reference dependence theory and prospect theory, Janiszewski and Cunha (2004) show that consumers respond more favorably to bundles when the discount is applied to the less valued or less preferred item. This is because such a discount shifts the lower-valued component from a perceived loss toward a neutral or gain domain, thereby increasing overall bundle attractiveness. In contrast, applying the same discount to the more valued product results in a smaller perceived utility gain due to diminishing sensitivity in the gain domain. Their findings suggest that discounting a near-expiry product—typically perceived as less desirable—can be more effective than applying the same discount to the fresher item in the bundle, even if that fresh item is the focal product. This reference-dependent framing, supported by loss aversion, amplifies the perceived value of the offer by eliminating a loss rather than enhancing an already perceived gain. These insights are particularly relevant for operational strategies involving mixed bundles with differing perceived quality levels.

While bundling has been criticized for contributing to overconsumption—since it encourages consumers to buy more than they initially need (Zhang et al., 2015)—this concern is less relevant in our context. The goal here is not to increase total consumption but to promote the selection of near-expiry items that would otherwise be wasted. As such, bundling in this case serves as a waste-reduction tool, not a consumption-expansion tactic. Research by Bakos and Brynjolfsson (1999) and M. Iravani et al. (2024) highlights that bundling can improve both consumer surplus and seller profitability. When used strategically, it creates a win-win scenario for retailers and consumers, particularly when one of the bundled components is at risk of spoilage.

Consumers often perceive bundles as better deals due to either real or perceived savings—even in the absence of an explicit discount (Heeler et al., 2007; Sharpe & Staelin, 2010). This perception can drive purchasing behavior through a sense of urgency or value maximization. While such effects may lead to excess in some markets, our framing encourages consumption only of items that are already nearing the end of their life cycle. By positioning the near-expiry item as the "discounted" component, we harness the psychological appeal of bundling without triggering unnecessary overconsumption. Furthermore, consumers tend to react negatively when they feel "forced" into a bundle that includes unwanted components, but the context of perishability here reframes this concern: the near-expiry item becomes the incentive, not the burden.

Taken together, these theories and empirical findings suggest that consumers will be more likely to select bundles with near-expiry products when the price discount is higher and strategically applied to the lower-valued item, as the perceived benefit outweighs the perceived compromise in quality.

Hypothesis 1. *If a higher discount is applied to a bundle that includes a near-expiry product, over the regular product alone, more people will prefer the bundle with the near-expiry product.*

While price is an important factor, timing also plays a critical role in how consumers evaluate bundled purchases—especially when perishable goods are involved. When consumers are offered a bundle that includes both a near-expiry item and a regular product, their willingness to choose the bundle may be influenced by how flexible the consumption schedule is. If the fresh component of the bundle can be delivered at a later time, consumers may feel more in control of when and how they use the products, which enhances the bundle's attractiveness.

This aligns with temporal construal theory (Trope & Liberman, 2003), in a manner that suggests consumers view future occurrences with greater abstraction and optimism. When delivery is flexible, the fresh item becomes psychologically more distant and less associated with immediate concerns like spoilage or storage. This high-level construal supports a more favorable evaluation of the bundle.

Further supporting this idea, Janiszewski and Cunha (2004) show that how bundles are framed—including which product appears to offer flexibility or relief from a perceived

constraint—can significantly shift consumer preferences. In their study, presenting discounts on the less-preferred item improved bundle attractiveness by reframing a loss into a neutral gain. In our case, flexible delivery of the fresher component may similarly reframe a logistical constraint as an added benefit, enhancing bundle appeal. In both cases, consumer evaluations improve when perceived compromises are removed or reframed—whether through pricing or timing.

Therefore, when a bundle allows consumers to delay part of their purchase, they are likely to view the offer as more compatible with their needs—even when the price discount remains the same.

Hypothesis 2: *When consumers are given the option to receive the regular product component of the bundle at any time within a specified period, under the same bundle discount condition, more people will prefer the bundle with the near-expiry product.*

4.2 Methodology

In alignment with the approach adopted in Study 1 and Study 2, we conducted an online decision-making experiment to evaluate our hypotheses in Study 3. The study received approval from the Institutional Review Board (IRB) at the university from which participants were recruited. Additionally, the entire study—including the experimental design, decision task, and all survey questions—was pre-registered prior to the commencement of data collection (AsPredicted: #225403).

4.2.1 Experimental Design

It was explained to the participants that they would be shopping for eggs in a store. Two purchasing options were presented. In the first option, participants could buy Product A,

a standard pack of fresh eggs with ten days remaining until its expiration date. This product was offered at the regular price of 100 TL. In the second option, participants were offered a bundle that included both Product A and Product B. Product B was a near-expiry version of the same item, with only three days left until expiration. The bundle in our study is consisting of one fresh and one near-expiry product, which was offered together at a discounted price.

A 2x2 factorial design was used to randomly assign participants to one of four between-subjects situations. One factor was the discount level, where the bundle was either offered at a high discount of 50 TL (final price: 150 TL) or a low discount of 35 TL (final price: 165 TL). The second factor was the delivery timing of the regular item in the bundle (Product A), which was either delivered immediately or via a flexible delivery option, allowing participants to get regular product at any preferred time within the following ten days without any need to consume immediately.

Participants were informed about both the expiration dates and delivery in their assigned conditions while making their decision. The inclusion of a near-expiry item in the bundle was highlighted, and the experimental context was designed to assess how price incentives and delivery timing influence the choice of a product with reduced shelf life.

4.2.2 Procedure

Participants were informed that they would assume the role of shoppers in a supermarket, specifically tasked with purchasing eggs. Following this, participants were presented with a decision-making scenario involving a choice between two purchasing options aligned with their assigned combination of discount level and delivery timing. This design enabled us to assess the influence of price magnitude and delivery flexibility on consumer preferences for bundles that include near-expiry items.

After completing the decision task, participants responded to three follow-up surveys. The first survey included attention check items, realism assessments, and manipulation check questions designed to validate participants' understanding of the scenario. The

second survey measured environmental attitudes, which captures participants' views on ecological issues, human-environment interaction, and sustainability beliefs (Dunlap et al., 2000). The third survey gathered demographic information, such as age, gender, and educational background

4.2.3 Participants and Experimental Checks

A total of 245 participants were recruited. These participants were undergraduate students from a range of academic disciplines at the university. Participants who successfully completed the study were awarded bonus points for one of their courses. They were permitted to make decisions at their own pace without any time constraints. To ensure data quality, participants who participated in more than one condition or who failed to answer at least two attention check questions correctly were excluded, resulting in a final sample of 237 participants (49.79% female, 48.95% male, 1.26% other).

To evaluate the participants' perception of the experimental conditions, we included realism and manipulation check items using 7-point Likert scales. The realism assessment consisted of two questions: (1) whether participants could imagine themselves in a similar shopping situation and (2) whether the overall study scenario felt realistic.

Manipulation checks were used to assess participants' recognition of product freshness and expiry. Participants responded to four items presented in random order: (1) Product A is a fresh item; (2) the Bundle Offer contains fresh items; (3) Product A has a very close expiry date; and (4) the Bundle Offer contains products whose expiry date is very close.

Additionally, participants completed the pro-environmental attitude survey. Participants were requested to rate their level of agreement with statements regarding environmental responsibility and resource utilization on a seven-point scale in this survey. We calculated the average environmental attitude score for each participant and compared scores across conditions using one-way ANOVA. There were no notable variations among the

experimental conditions, suggesting that the baseline environmental attitudes were consistent. *(F (3, 233) = 0.56, p = .641)* The results are presented in Table 4.1.

Table 4.1 Summary of Participant Responses Across Experimental Conditions

Condition	High Discount & Flexible Delivery	High Discount & Immediate Delivery	Low Discount & Flexible Delivery	Low Discount & Immediate Delivery
Fresh A	5.19	5.14	5.34	5.34
Bundle Fresh	3.15	3.94	3.08	3.77
Product A Close Expiry	2.9	3.14	2.66	3
Bundle Close Expiry	5.61	5.47	5.4	5.51
Bundle Significant Discount	5.19	5.42	4.96	5.39
Bundle Discount due to Near Expiry	5.87	6.11	5.86	6.05
Get Second Product Immediately	3.23	-	3.62	-
Average ESQ Score	4.94	4.88	4.84	4.92

We also conducted a paired-samples t test comparing perceived freshness and proximity to expiry for Product A and the Bundle Deal across the different experimental conditions. Participants consistently rated Product A as significantly fresher than the bundled product, with mean freshness ratings ranging from 5.14 to 5.34 for Product A, and from 3.08 to 3.94 for the bundle. This difference was statistically significant , *t(236) = 14.82, p < .001, 95% CI [1.51, 1.97].* On a 7-point Likert scale, Product A was rated, on average, 1.74 points fresher than the Bundle, confirming that participants clearly distinguished between the freshness levels of the two products. Similarly, participants perceived Product A as having a closer expiry date than the bundle, with expiry proximity ratings ranging from 2.66 to 3.14 for Product A, compared to 5.4 to 5.61 for the bundled product. A paired-samples t-test revealed a significant difference in perceived closeness to expiry between Product A and the Bundle Deal*, t(236) = –18.83, p < .001, 95% CI [–2.83, –2.29]*. On a 7-point Likert scale, the Bundle was rated, on average, 2.56 points closer to expiry than Product A.

4.3 Results

The statistical analysis provides partial support for the proposed hypotheses regarding how discount level and delivery timing affect consumer selection of bundles that include near-expiry products. Findings are presented in Figure 4.1 and Table 4.2.

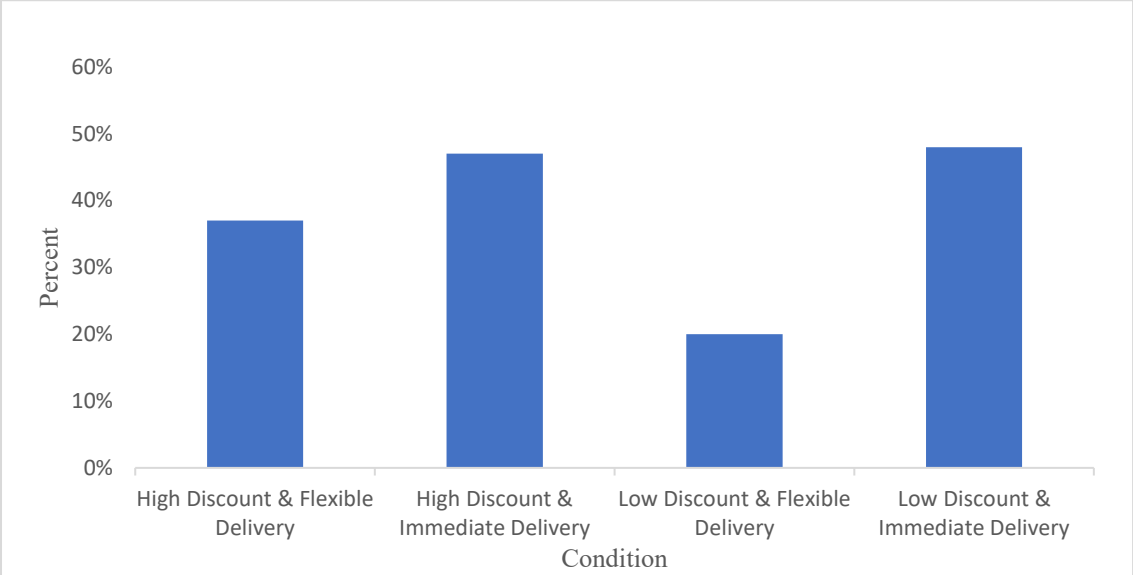

Figure 4.1 Product B Selection Percentages Across Conditions

Table 4.2 Z-Test Results Comparing Product B Selection Rates Across Experimental Conditions

Condition 1	Bundle %	Condition 2	Bundle %	z-value	p	H #	Support
High Discount & Flexible Delivery	37%	Low Discount & Flexible Delivery	20%	1.973	0.048	H1	Yes
High Discount & Immediate Delivery	47%	Low Discount & Immediate Delivery	48%	-0.074	0.940	H1	No
High Discount & Flexible Delivery	37%	High Discount & Immediate Delivery	47%	-1.111	0.266	H2	No
Low Discount & Flexible Delivery	20%	Low Discount & Immediate Delivery	48%	-6.439	<0.001	H2	No

Hypothesis 1 predicted that applying a high discount would increase the selection percentage of the bundle deal over a regular product, compared to a low discount. This

hypothesis received partial support. When delivery was flexible, significantly more participants selected the bundle in the high discount condition (37%) than in the low discount condition (20%), and this difference was statistically significant ($z = 1.973$, $p = 0.048$), suggesting that higher discounts can enhance bundle appeal when delivery is not constrained. However, no such effect was observed in the immediate delivery condition, where the selection rates were nearly identical between high (47%) and low (48%) discount scenarios ($z = -0.074$, $p = 0.940$). This indicates that the effectiveness of discounting may depend on delivery timing and does not always translate into greater selection.

Hypothesis 2 posited that immediate delivery would increase bundle selection compared to flexible delivery, particularly when discounts were low. The results do not support this hypothesis. Under high discount conditions, bundle selection was actually higher with immediate delivery (47%) than with flexible delivery (37%), but this difference was not statistically significant ($z = -1.111$, $p = 0.266$). In the low discount condition, however, bundle selection was substantially higher under immediate delivery (48%) than under flexible delivery (20%), and this difference was highly significant ($z = -6.439$, $p < 0.001$). These results suggest that immediate delivery enhances bundle appeal particularly when discounts are low, possibly due to perceived freshness or simplicity, rather than abstract flexibility (see Figure 4.2)

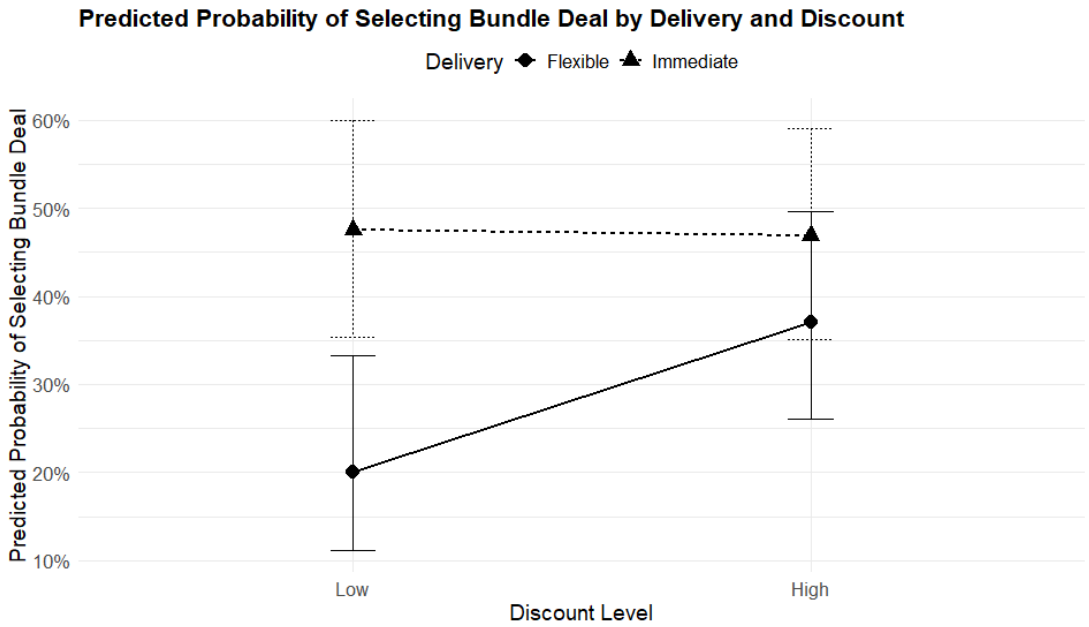

Figure 4.2. Predicted Probabilities Across Delivery and Discount Conditions

A logistic regression was conducted to test whether the effect of discount level on the selection of bundles containing near-expiry products was moderated by delivery timing. The interaction between Discount and Delivery Timing was not statistically significant ($b = –0.88, SE = 0.57, z = –1.56, p = .119$), suggesting that the difference in discount effectiveness between immediate and flexible delivery was not strong enough to reach statistical significance. While the model detected a general preference for high discounts and immediate delivery overall, the interaction term does not provide reliable evidence that discount responsiveness depends on when the product is delivered.

As shown in Figure 4.2, the predicted probability of selecting the Bundle Deal increased from 28% to 65% under flexible delivery when moving from a low to high discount, indicating noticeable price sensitivity. In contrast, under immediate delivery, selection was already relatively high at the low discount level (around 61%) and increased only modestly with a high discount. This visual pattern suggests that immediacy may serve as a psychological benefit—possibly through reduced perceived risk or increased freshness—even when monetary savings are limited. However, because the interaction effect did not reach statistical significance, these trends should be interpreted with caution and not as evidence of a robust moderating effect.

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4.4. Discussion

Study 3 set out to investigate how consumers respond to bundles that include a near-expiry product, focusing on two factors: the level of discount and the timing of delivery for the regular item. While grounded in a robust theoretical foundation drawn from consumer behavior, behavioral economics, and decision-making theories, the results of the study only partially supported the proposed hypotheses.

Hypothesis 1, which posited that high discounts would increase bundle selection compared to low discounts, received partial support. When participants were given the option of flexible delivery, those in the high discount condition were significantly more

likely to select the bundle than those in the low discount condition. This finding supports theoretical perspectives such as perceived risk theory and mental accounting. In this context, a larger discount appears to serve as a form of risk compensation, helping consumers reframe the inclusion of a near-expiry product as acceptable—or even advantageous—when the perceived savings are substantial. The psychological perception of getting a "good deal" likely mitigated some of the concerns about reduced freshness. This aligns with the prospect theory framework (Kahneman & Tversky, 1979), where the perceived value of gains is not evaluated in absolute terms but relative to a reference point. In this case, the high discount serves as a salient gain that offsets the perceived loss associated with reduced freshness. The contrast effect between the discount and the product's near-expiry status reframes the offer as a net positive, thereby increasing acceptance.

However, this positive effect of discounting did not hold under immediate delivery conditions. When the regular product was delivered right away, high discounts did not significantly outperform low discounts in encouraging bundle selection. This suggests that while discount magnitude can enhance perceived value, its effectiveness is constrained by other contextual factors—namely, the delivery structure. The immediacy of delivery may have amplified perceived limitations of the bundle, such as the pressure to consume both items quickly, thus negating the impact of the discount. This reinforces the idea that pricing strategies cannot operate in isolation; how the offer is experienced by the consumer plays a critical role in shaping its perceived attractiveness. Moreover, the preference for immediate delivery undercuts the assumption that more options lead to better decisions. In line with choice overload literature (Iyengar & Lepper, 2000), too many alternatives or added complexity—such as delayed delivery requiring further planning—may increase cognitive load, leading to decision aversion or default to simpler options.

Hypothesis 2, which anticipated that flexible delivery would enhance the attractiveness of the bundle under the same discount condition, was not supported. In fact, the findings revealed a counterintuitive pattern: participants in the low discount condition were significantly more likely to choose the bundle when the regular product was delivered immediately, rather than flexibly. This outcome challenges the theoretical expectation that flexible delivery increases perceived autonomy and planning ease—concepts supported by temporal construal theory and perceived control theory. One possible

explanation is that in the context of perishable goods, immediacy communicates freshness and certainty, which consumers may prioritize over abstract planning flexibility. Flexible delivery, while intended to empower the consumer, may have introduced ambiguity or added complexity to the decision, especially when the financial benefit was relatively modest. This phenomenon may also be explained by construal level theory (Trope & Liberman, 2003), which suggests that near-future events are processed more concretely and are thus more influential in decision-making. Immediate delivery situates the purchase in the low-level construal frame—tied to tangible benefits like guaranteed freshness—whereas flexible delivery invokes abstract considerations, which may carry less persuasive weight in a low-stakes, perishable goods setting.

Interestingly, even under high discount conditions, offering flexible delivery did not lead to significantly greater bundle selection. This suggests that the psychological benefits of optionality and planning autonomy—while theoretically compelling—may not be strong enough to influence behavior in settings where perishability, storage, and convenience are salient concerns. Consumers may have defaulted to the simplest, least uncertain choice: receiving both items immediately. In this sense, the abstract promise of flexible consumption may have been less persuasive than the concrete immediacy of the full bundle. Another possible explanation lies in the framing of time-related attributes. Flexible delivery might have been perceived not as a benefit but as a delay or added uncertainty. Future research could test whether explicitly framing flexible delivery as an opportunity for better consumption planning—as opposed to a vague or delayed outcome—could restore its intended positive effect.

These findings contribute to the broader theoretical understanding of behavioral pricing and time-sensitive decision-making, suggesting that perceived control and price attractiveness must be evaluated in tandem with contextual and temporal cues. The results also highlight the limits of flexibility in influencing sustainable consumer behavior, especially when risk salience (e.g., perishability) is high.

From a managerial standpoint, these results carry important implications for designing effective bundling strategies for perishable goods. Retailers should recognize that while discounts are a powerful tool, their success depends on how they are embedded within the broader customer experience. Simply adding flexibility does not guarantee increased uptake; in some cases, it may even dilute the impact of the promotional offer. Operational

simplicity and clarity, especially around consumption timelines, may play a greater role in influencing consumer decisions than previously assumed.

For practical implementation, firms could consider integrating immediate delivery bundles at high discount levels as a standard clearance strategy for near-expiry items.. However, retailers must weigh the costs of bundling, including potential increases in packaging, logistics coordination, and inventory planning. For example, offering immediate delivery for both items may require synchronized stocking and fulfillment, potentially increasing handling costs or requiring adjustments to inventory turnover cycles.

In contrast, flexible delivery options, while theoretically appealing, introduce operational complexity. These may involve delayed shipment coordination, partial order tracking, or increased storage requirements if the fresh item is not immediately dispatched. Additionally, if not clearly communicated, flexible delivery may lead to customer dissatisfaction due to uncertainty or perceived delays—highlighting the importance of messaging and expectation management.

There are also strategic trade-offs to consider. Bundling a near-expiry item with a regular item at a discount may cannibalize full-price sales of the latter, especially if consumers start waiting for bundle deals instead of purchasing items individually. Moreover, repeated use of steep discounts may undermine the brand's pricing integrity, particularly for premium retailers. Thus, firms must balance short-term gains in inventory clearance with long-term effects on brand positioning and customer price expectations.

In sum, Study 3 advances our understanding of how consumers evaluate bundled offers that involve trade-offs between freshness, price, and flexibility. The findings suggest that consumers are highly sensitive to the structure and immediacy of consumption, and that psychological responses to risk, convenience, and control are key drivers of choice. Although the hypotheses were only partially confirmed, the study offers valuable insights into the behavioral dynamics underlying sustainable consumption decisions—especially in contexts where shelf life and product usability are front of mind.

5. CONCLUSION

This dissertation set out to explore how consumers can be encouraged to choose near-expiry food products—an increasingly relevant challenge for sustainable retail operations. Through three experimental studies, this research examined how behavioral nudges, brand-related signals, and bundling strategies influence consumer choices in realistic retail contexts.

Study 1 demonstrated that high discounts alone did not significantly increase preference for near-expiry items. Instead, the most effective intervention was a social norm message, which highlighted that other consumers were already making similar sustainable choices. This message significantly increased selection and even outperformed financial incentives. Meanwhile, quality and self-image nudges showed limited effectiveness for highly perishable items like eggs, though they were more successful in a follow-up test using cereal. This variation across product categories underscores the importance of tailoring interventions to the specific context and perceived freshness of the product.

Study 2 examined the potential role of brand image and customer loyalty. Contrary to expectations, premium branding and consumer loyalty did not increase the selection of near-expiry items. In fact, under high discount conditions, consumers were more likely to choose near-expiry products from regular brands than from premium ones. This suggests that higher brand expectations may actually heighten consumer sensitivity to perceived quality compromises. Similarly, loyalty failed to offer the protective effect anticipated, likely because concerns over freshness dominated more abstract brand associations.

Study 3 tested bundling as an operational strategy, combining near-expiry products with regular items to increase appeal. Contrary to expectations, flexible delivery did not enhance bundle selection under low discount conditions. In fact, bundles with immediate

delivery led to significantly higher selection in those cases. This suggests that when freshness is top of mind, consumers may prefer straightforward and immediate options over more flexible arrangements that introduce uncertainty or decision complexity.

Taken together, these findings offer several practical insights. Retailers aiming to reduce food waste should consider incorporating social norm-based messaging into their near-expiry pricing strategies. These messages are cost-effective, easy to implement, and consistently more persuasive than offering deeper discounts. Second, bundling near-expiry items with regular products can be effective—but only if the bundle is simple and clearly framed. Immediate delivery, particularly when paired with modest discounts, may be more compelling than flexible options. Lastly, brand equity and loyalty—while generally valuable—may not be sufficient to overcome consumer concerns about freshness, and may even backfire if expectations are not met.

While the experiments were designed to reflect plausible shopping decisions, several limitations remain. One important challenge is the issue of product substitution, which was not present in the decision tasks. In actual retail settings, consumers frequently encounter a diverse array of alternative products—both fresh and variably priced—which can substantially impact their choices. The absence of such realistic substitution options in the experimental settings may have simplified the trade-offs participants faced, potentially affecting the ecological validity of the findings. Additionally, each experimental condition involved only a single intervention. Future work could explore how combining nudges or tailoring interventions to specific customer segments might further improve their effectiveness.

Despite these limitations, the findings contribute to the growing conversation around food waste, behavioral science, and retail operations. Encouraging the selection of near-expiry products is not just a matter of pricing—it is about how consumers interpret cues related to value, social approval, brand trust, and simplicity. Thoughtfully designed interventions that consider these psychological and contextual factors can help shift behavior in meaningful ways, benefiting both retailers and the broader sustainability agenda.

Looking ahead, future research can build on these findings in several ways. One promising direction is the exploration of personalized nudging strategies—tailoring messages or incentives based on individual consumer profiles, values, or past behavior.

Such personalization could enhance the relevance and effectiveness of interventions in diverse retail settings. Additionally, our studies did not incorporate realistic substitution scenarios, where consumers might have the option to choose entirely different product categories or formats. Since product substitution is a common behavior in real shopping environments, future experiments should account for this complexity to better reflect actual decision dynamics. Finally, while our experiments provided controlled insights, they were conducted online and lacked the immediacy, sensory cues, and spontaneous behaviors present in physical retail spaces. Real-world field experiments in dynamic, in-store contexts would be valuable in assessing how these interventions perform at scale, over time, and across different consumer segments. Such efforts would not only strengthen the external validity of this research but also provide actionable guidance for retailers aiming to implement sustainable practices in practice—not just in theory.

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APPENDIX A

Study 1 Screens and Questions

Instructions

You will read about a circumstance and respond to some questions as part of this study. Please carefully study the material supplied and attempt to picture your feelings and course of action in the given scenario. Assume that all of the information provided is correct and covers what you require.

Background Information

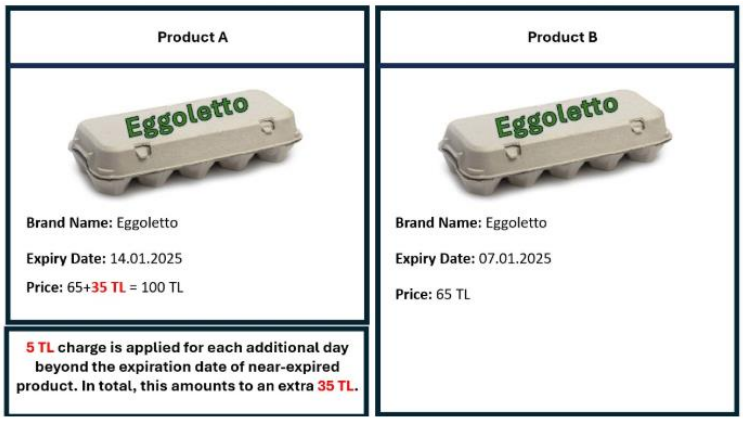
Imagine you are in the dairy section of the supermarket and you are going to **buy eggs**.

Remember that today is **January 4th (04.01.2024/2025).**

The following two options are available to you in the supermarket:

Message and Discount Condition Screen:

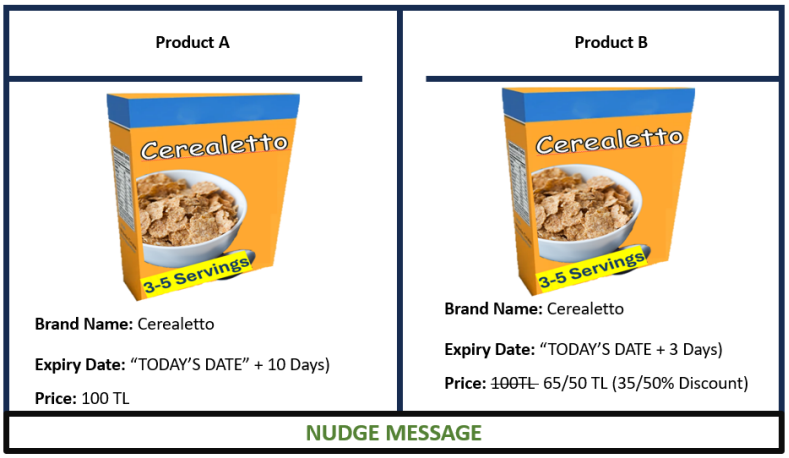
Total Reduction Condition Screen:



Premium Payment Screen:

Premium Payment Question Condition Screen:

Cereal Product Screen for Message and Discount Conditions:



1. Today is January 4th. Which product would you buy?

Product A

Product B

Questions

1.a. In this study, where were you shopping?

a) Clothing store b) Supermarket c) Toy Store d) Café

1.b. Today is "TODAY'S DATE". Please rate your level of agreement with the following statements:

(1:Strongly Disagree, 7: Strongly Agree)

"Product A is a fresh item."

"I had no difficulty imagining myself in the situation described in the study."

"Product B is a fresh item."

"Product A is a product whose expiry date is very close."

" I thought the situation described in this study realistic."

"Product B is a product whose expiry date is very close."

1.c. In this study, what was the product that you were purchasing?

a) Milk b) Yoghurt c) Eggs/Cereal d) Butter

APPENDIX B

Study 2 Screens and Questions

Instructions

You will read about a circumstance and respond to some questions as part of this study. Please carefully study the material supplied and attempt to picture your feelings and course of action in the given scenario. Assume that all of the information provided is correct and covers what you require.

Background Information

Imagine you are in the dairy section of the supermarket and you are going to **buy eggs**.

The following items are available to you in the supermarket:

Remember that today is **"TODAY'S DATE". ("TODAY'S DATE" will be updated while conducting the study)**

1. Today is "TODAY'S DATE". Please indicate which product you would buy.

Product A or **Product B**

Questions

1.a. In this study, where were you shopping?

a) Clothing store b) Supermarket c) Toy Store d) Café

1.b. Today is "TODAY'S DATE". Please rate your level of agreement with the following statements:

(1:Strongly Disagree, 7: Strongly Agree)

"Product A is a fresh item."

"I had no difficulty imagining myself in the situation described in the study."

"Product B is a fresh item."

"Product A is a product whose expiry date is very close."

" I thought the situation described in this study realistic."

"Product B is a product whose expiry date is very close."

1.c. In this study, what was the product that you were purchasing?

APPENDIX C

Study 3 Screens and Questions

Instructions

You will read about a circumstance and respond to some questions as part of this study. Please carefully study the material supplied and attempt to picture your feelings and course of action in the given scenario. Assume that all of the information provided is correct and covers what you require.

Background Information

Imagine you are in the dairy section of the supermarket and you are going to **buy eggs**. The following items are available to you in the supermarket:

Remember that today is **"TODAY'S DATE". ("TODAY'S DATE" will be updated while conducting the study)**

Product A

Brand Name: Eggoletto

Expiry Date: TODAY'S DATE + 10 Days

Price: 100 TL

BUNDLE DEAL

Brand Name: Eggoletto

Expiry Date: TODAY'S DATE + 3 Days

Brand Name: Eggoletto

Expiry Date: TODAY'S DATE + 10 Days

~~**Price:** 100 TL~~ ~~**Price:** 100 TL~~

Total Price: ~~200 TL~~ **165 TL or 150**
(35 TL or 50 TL Discount)

IF FLEXIBLE DELIVERY:

Get **Product 1** product **NOW** ,

Receive **Product 2 (Any Eggoletto Of Your Choice)**

AT ANY TIME within 10 days!

1. Today is "TODAY'S DATE". Please indicate which product you would buy.

Product A or **Bundle Deal**

Questions

1.a. In this study, where were you shopping?

a) Clothing store b) Supermarket c) Toy Store d) Café

1.b. Please rate your level of agreement with the following statements:
(1:Strongly Disagree, 7: Strongly Agree)

"Product A is a fresh item."
"I had no difficulty imagining myself in the situation described in the study."
"Bundle Deal includes a fresh item."
"Product A is a product whose expiry date is very close."
" I thought the situation described in this study realistic."

1.c. In this study, what was the product that you were purchasing?

a) Milk b) Yoghurt c) Eggs d) Butter

APPENDIX D

Demographics Questions

Age

Numeric Input

Gender

Male/ Female/ Not Listed

Education Level

Undergraduate/ Graduate/ PhD