

The Application of Loss Aversion and Sunken Costs in Behavioral Economics: A Case Study

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Abstract. This study investigates the application of behavioral economics concepts—loss aversion and the sunk cost fallacy—to contemporary digital and sustainable business models. These models increasingly take use of cognitive biases to increase profits, frequently at the expense of customer welfare. Through a multi-case study of TikTok's live commerce scarcity strategies, Netflix's auto-renewal subscriptions, and Patagonia's green premiums, the study analyzes how businesses strategically take advantage of these biases using theoretical frameworks from behavioral literature and Prospect Theory. Key findings show that TikTok uses artificial scarcity and time pressure to increase impulse purchases, taking advantage of the sunk costs of viewer attention; Netflix uses loss aversion (fear of losing personalized content) and sunk costs (justification of prior payments) to sustain "zombie subscriptions"; and Patagonia's eco-pricing unintentionally leads to moral licensing, where moral purchases justify subsequent unsustainable behaviors. The study emphasizes the two-pronged effects of such tactics: increasing profits at the expense of consumer remorse, monetary loss, and environmental tradeoffs. This work, which creatively connects traditional behavioral theories with modern business practices, suggests practical solutions, including consumer education, policy reforms, behavioral "nudges" (e.g., cooling-off periods, sunk cost visualizations), and transparency mandates (e.g., usage reminders for subscriptions, real-time inventory disclosures). These recommendations attempt to combine corporate profitability with ethical consumer protection, producing a balanced market ecology that mitigates irrational decision-making and encourages sustainable consumption.

Keywords: Loss Aversion, Sunk Cost, Behavioral Economics.

1. Introduction

A fundamental concept in behavioral economics, loss aversion refers to people's propensity to place a higher value on losses than on comparable gains. This idea was initially presented by Kahneman and Tversky in 1979, showing that "losses loom larger than gains" causes people's actions to consistently stray from reasonable expectations [1]. For instance, the sorrow of losing \$100 frequently surpasses the joy of winning the same sum. On the other hand, sunk costs are irreversible past investments (including time, money, and effort) that people erroneously take into account when making decisions today. Arkes and Blumer defined the "sunk cost fallacy" as the tendency to continue with unsuccessful endeavors purely due to previous investments [2]. This bias is exemplified, for example, by continuing a project that is hopeless due to the money already expended.

The theoretical knowledge of loss aversion and sunk costs has evolved via critical studies spanning five decades. The basis was created by the study of Kahneman and Tversky, which objectively shown that psychological losses exceed equal gains—a phenomenon dubbed loss aversion [1]. Soon later, Arkes and Blumer released fresh study results that empirically confirmed the "sunk cost fallacy" as a recurring illogical prejudice in judgment. [2]. Building on this, Tversky and Kahneman expanded loss aversion to riskless contexts (e.g., consumer pricing) in 1991, while Camerer et al. demonstrated the neurological underpinnings of loss aversion by bridging the fields of behavioral economics and neuroscience in 2005 [3, 4]. These ideas ultimately became more widely acknowledged by Kahneman's 2011 book *Thinking, Fast, and Slow*, which focused on their value in business and policy. [5]. Recently, in the research of Thaler in 2015, an example of defaulting enrollment in retirement savings programs applied loss aversion and sunk costs to policy design, claiming that loss aversion supports "nudge" interventions [6]. Collectively, these studies demonstrate the development from

theoretical models to practical instruments in business, policy, and consumer behavior, underlining their real-world importance in minimizing irrational decision-making.

With the development of the times, the Internet and media technologies have undergone tremendous changes, video platforms have sprung up, online goods have gradually occupied the market, and many brands have begun to use loss aversion and sunk costs to induce customers to consume and affect the commercial market. This article will specifically introduce the application of loss aversion and sunk costs in the modern business environment. By analyzing the theoretical logic behind these business behaviours, suggestions for behaviour optimization will be proposed to create a better business environment.

2. Subscription Services and Auto-Renewal Traps

2.1. Case Description

Over 75% of online brands are anticipated to offer subscription services by 2025, according to global research, which projects that e-commerce will grow at a rate more than five times that of traditional retail. Subscriptions offer distinctive value propositions like time savings, simplicity, discovery, flexibility, and exclusivity, which appeal to busy consumers who are struggling with decision fatigue and crowded markets [7].

Netflix, a subscription-based digital streaming service provider, provides services for watching a huge range of movies and TV shows in over 190 countries. Recognizing the promise of video streaming technology since 2007, Netflix has transformed from a DVD rental company to a prominent platform for smartphones, computers, tablets, and smart TVs [8].

The emergence of Netflix has caused significant disruption and transformation in the media and entertainment industry. The company's shift to a subscription-based revenue model has had a big impact on how people consume content. With its unrestricted streaming for a monthly fee, Netflix completely changed the traditional pay-per-view or cable TV model. This reduced the need for expensive cable subscriptions and allowed consumers greater choice over what they watched. This modification gave viewers access to a vast knowledge collection on any device, at any time, and released them from the limitations of scheduled programming. [9].

However, Netflix has an auto-renewal subscription model in which customers are billed either monthly or annually unless they want to actively cancel. Many clients who maintain their memberships despite low use rates. This phenomenon are referred to as "zombie subscriptions," a phrase used by spend management experts to characterize subscriptions that automatically renew without the subscribers' awareness [10]. This situation may result in significant economic losses and fail to bring any benefits to customers, in other words, it is a entirely unnecessary expenditure. According to a 2020 survey, the typical business spends \$135,000 year on zombie subscriptions [11].

2.2. Theoretical Analysis

The auto-renewal subscription model exploits behavioural biases rooted in loss aversion and sunk cost fallacy. According to Kahneman and Tversky's Prospect Theory in 1979, losses are psychologically weighted approximately twice as heavily as equivalent gains, creating an asymmetric aversion to perceived deprivation [1]. This explains why users disproportionately fear losing access to services (e.g., personalized watchlists or algorithmic recommendations) compared to the utility gained from retaining them.

Thaler's seminal work in 1980 defines sunk costs as irrecoverable past investments that irrationally influence ongoing decisions [12]. In the context of subscriptions, upfront payments (e.g., annual fees) create a mental obligation to continue payments to avoid "wasting" prior expenditures, even when usage declines. Empirical evidence supports this: approximately 60% of subscribers retain services passively due to inertia or forgetfulness, as reported by Statista [13].

The interaction of these mechanisms directly affects customer behaviour. Auto-renewal defaults leverage inertia, as users often defer cancellation despite underuse. The default value for automatic

renewal utilizes the customer's habitual thinking, as users often postpone cancellations despite underutilization. Resulting in passive retention of a large number of customers, leading to implicit consumption by customers. At the same time, personalized features (such as carefully curated profiles) amplify people's perception of ownership, making interruptions feel like losing a 'talent' asset [3]. This fear of loss leads customers to ignore the subscription deadline and fees, and default to continuing to pay for the money that does not bring actual benefits. In addition, according to Arkes and Blumer's research, annual user commitment increases to prove that previous payments are reasonable, even if the marginal utility is negative [2]. This behaviour of rationalizing sunk costs originates from customers' long-term self-psychological suggestions and results from the joint guidance of fear of loss and habitual thinking.

2.3. Behavioral Optimization

Kahneman and Tversky's Prospect Theory posits that framing reminders around potential losses (e.g., "You'll lose access to your watchlist") amplifies salience compared to gain-based messaging [1]. Therefore, the platform should change its reminder strategy and use personalized usage reminders (e.g. "You watched 2 hours last month"). This method informs customers of gains and losses, protecting their right to information and autonomy. Some people suspect that this approach will lead to a decrease in merchant profits, but in fact, this form can greatly prevent passive churn and expand the platform's reputation [14]. The platform can remind customers through methods mandating loss-framed notifications sent via SMS/email 3 days before renewal and including usage statistics (e.g., "Active days: 5/30") to trigger reevaluation. However, platforms should also take into account the demand from certain customers for default automatic renewal when calculating cognitive and decision-making expenses. Autonomous renewal saves this consumer group time while deciding whether to renew. For them, these costs fall under the category of lowering the opportunity cost resulting from this choice rather than departing from maximizing utility.

Defaults exploit status quo bias, where users stick with pre-selected options [15]. Therefore, the platform's auto-renewal can be transformed into opt-in renewal. However, Netflix's current "pause membership" feature is underpromoted. To mitigate irrational retention, policymakers and Netflix could automatically pause subscriptions after 60 days of inactivity (retain user data but halt payments) and continue billing only after obtaining the customer's explicit consent.

3. Live Commerce Scarcity Tactics

3.1. Case Description

With the rapid development of social media and the Internet, businesses must adopt a dynamic approach to stay competitive in the ever-changing business environment [16]. Recently, the live commerce market started from China and has become a new trend in e-commerce worldwide [17]. Live commerce is a streaming broadcasting type of commerce that introduces products by communicating with consumers through chat [18]. In live commerce, live streamers can show viewers products/services by making live videos and allowing viewers to inquire about product or service details [19].

Online shopping and logistics systems are growing rapidly, and the COVID-19 pandemic has further accelerated the growth of online shopping [20]. The primary sales channel is moving from traditional offline to online.

Originally a video-sharing app, TikTok has become increasingly popular as a result of the COVID-19 pandemic because more people are utilizing their mobile devices to experiment with new ways of communicating with others, doing business, and making purchases [21].

The live commerce of TikTok, such as TikTok Shop, uses scarcity strategies, influencer credibility, and real-time engagement to encourage impulsive purchases. Limited-time offers, countdown timers and fictitious stock shortages are common tactics used by sellers and influencers to compel viewers to make snap decisions.

Undoubtedly, the emergence of live-streaming sales has brought more benefits to businesses and more users to platforms. However, this phenomenon has also caused a lot of chaos. Many businesses take advantage of customers' aversion to the loss of scarce goods, using false inventory and price information to induce customers to purchase their products, forming a vicious competition in online commerce.

3.2. Theoretical Analysis

The behavioural mechanisms driving impulsive purchases in livestream commerce can be explained through loss aversion and sunk cost fallacy. Meanwhile, merchants guide customers' loss aversion psychology by utilizing herd behavior

Herding in behavioral economics refers to the phenomenon where individuals mimic the actions or choices of others, often leading to a collective behavior that might not be based on independent and rational decision-making [22]. For example, individuals might choose a particular product or service because it is popular among their peers, without necessarily evaluating the product's quality or suitability for their needs. Influencers take advantage of this mentality by creating an atmosphere of hot selling products and attracting customers with product discounts, making customers feel that most people have purchased the discounted products and that not purchasing them is a loss.

In Livestream commerce, influencers exploit this bias by framing flash sales (e.g. "50% off for the next 10 minutes!") as a loss of opportunity if viewers hesitate. False scarcity claims ("Only 3 left!") amplify perceived urgency, triggering fear of missing out (FOMO) akin to Cialdini's scarcity principle [23]. When promotions are set within a limited time frame, the decision-making time is shortened creating time pressure for consumers [24]. Dong et al. studied the mediating role of time pressure in terms of regulating the influence between other factors such as credibility, professionalism, attractiveness, and interaction leading to consumer impulsive buying behaviour [25].

Moreover, Arkes and Blumer demonstrated that prior investments (time, money, or effort) lead individuals to escalate commitment to irrational decisions [2]. As a result, in livestream contexts, time investment is one of the important factors affecting whether customers place orders or not: viewers who spend much time watching a stream perceive their time as a sunk cost, increasing their likelihood of purchasing to "justify" their investment. At the same time, the sales model of live streaming sales utilizes ways to increase audience engagement, just like the theory proposed by Beggan in 1992, interactive engagement (e.g., commenting, sharing) fosters psychological ownership, making disengagement feel like a loss [26].

Furthermore, exaggerated stock alerts ("10 remaining!") create artificial scarcity, leveraging anchoring effects to frame prices as "bargains" relative to inflated original prices [27]. This tactic exploits both loss aversion (fear of missing the deal) and sunk costs (time invested in monitoring the sale) to stimulate impulsive buying behaviour.

3.3. Behavioral Optimization

Impulse purchases during live streams are often driven by time pressure and scarcity heuristics [23].

The sunk cost fallacy explains how the time invested in watching streams increases the purchase likelihood to "justify" the effort [2]. Therefore, the platform should promote the visualization of customers' sunk costs and strengthen reminders of customer needs, advocating for "on-demand purchasing". For example, TikTok can mandate pop-up notifications every 10 minutes during streams (e.g., "Consider your actual needs") and display cumulative watch time on-screen to make sunk costs salient to serve as a reminder to customers.

Moral licensing and cognitive load hinder informed decision-making in fast-paced environments [28, 29]. The ambiguity of customers' own needs and the limitations of their educational level provide some businesses with the conditions to use their psychology to induce irrational purchasing decisions. In response to this situation, platforms should strengthen customers' understanding of behavioural economics while conducting commercial activities. By popularizing the underlying logic of

merchants' live-streaming sales and promotions, they can guide customers to consume reasonably and make rational choices. For instance, the policy can require platforms to display educational banners before streams (e.g., "Scarcity claims may be exaggerated"). In addition, the platform can also integrate small tutorials into user registration tutorials (e.g., "How to spot false scarcity").

The platform could also improve consumer-oriented consumption restrictions, such as imposing a cooling-off time (which would allow customers to keep their free refund rights for one to two hours after making a purchase) and a return policy (which would allow for a seven-day refund without a cause). Furthermore, the platform ought to improve merchant marketing control, prevent marketing interference for consumers, particularly those without steady incomes and the capacity to make sensible consumption decisions (such as minors), and improve minor consumption control. Based on brain imaging data, teenagers have a stronger neural response to emotional advertising (such as "limited time discounts" and "internet celebrity recommendations"), activating the reward-related nucleus accumbens [30]. Therefore, minors are more sensitive to the emotional effects of commercials and are more likely to engage in irrational consumption.

4. Green Premiums and Moral Licensing

4.1. Case Description

Environmental concerns have been changing the business world during the last few years. The increased number of research highlighting the dangerous consequences of environmental problems has changed consumers' perceptions of the topic [31]. People are gradually realizing that their actions may affect the ecological environment of the earth and green consumption gradually occupies market share. Consequently, it is anticipated that the consumer market for green products would reach \$845 billion in 2015, representing a roughly 267% increase since 2009 [32]. To respond to consumer demands, an increased number of companies started offering products with reduced environmental impact [31].

Patagonia, a for-profit American company that mainly sells clothes for outdoors' sports, has been introducing practices to reduce the environmental footprint of its operations since its foundation. Indeed, the company is identified by several as a pioneer in corporate environmentalism [31]. However, the extent to which green marketing campaigns grant companies a competitive advantage depends on the levels of involvement and honesty placed in their communications. As a leader in sustainable outdoor apparel, Patagonia charges premium prices for eco-friendly products (e.g., recycled polyester jackets, Fair Trade Certified™ clothing). While this aligns with its mission ("Earth is now our only shareholder"), consumers often exhibit paradoxical behaviours after purchasing such products.

In fact, green marketing can also be extremely risky if not introduced in the correct way [31]. Consumers tend to reject green claims perceived as false or misleading, seriously damaging the company's reputation [33]. Besides, even though consumers are increasingly worried about the environment, some of them are not translating these concerns into regular purchases of green products.

4.2. Theoretical Analysis

The interplay of loss aversion, sunk cost fallacy, and moral licensing explain paradoxical consumer behaviours in sustainable consumption, exemplified by Patagonia's pricing and usage patterns.

According to Kahneman and Tversky, people are reluctant to pay premium pricing because they believe that losses have double the impact of profits [1]. Patagonia's price markup for sustainable products frames eco-consciousness as a financial loss, which consumers often offset through compensatory behaviours to "balance" perceived sacrifices.

Mazar and Zhong demonstrated that ethical purchases (e.g., Patagonia gear) grant consumers psychological "licenses" to later engage in unethical acts (e.g., overconsumption), rationalizing, "I've done enough for the planet" in 2010 [28]. This is consistent with Festinger's theory of cognitive

dissonance, which holds that consumers overestimate the environmental effect of green premiums in order to justify them [34].

Furthermore, Arkes and Blumer showed that upfront investments (e.g., high prices) lead to irrational commitments to justify sunk costs [2]. Patagonia buyers overuse products (e.g., wearing jackets for years) to “get their money’s worth”, a behaviour amplified by mental accounting, where costs are categorized as “virtuous spending” rather than pragmatic budgeting [35].

4.3. Behavioral Optimization

The sunk cost fallacy drives consumers to over-retain or overuse products to justify high upfront costs (e.g., Patagonia’s premium-priced jackets) [2]. For instance, Patagonia’s Worn Wear program exemplifies this by rewarding customers for returning used gear. In response to this situation, Patagonia can adopt offering discounts on future purchases for returning old items (e.g., “Trade in your jacket for 20% off”) and partnering with policymakers to subsidize repair services, reducing the perceived “loss” of discarding items.

Loss aversion makes green premiums feel like sacrifices [1]. Dynamic pricing that ties discounts to sustainable behaviours (e.g., recycling) can reframe costs as gains. A field experiment by Allcott and Rogers in 2014 showed that moral incentives (e.g., “Earn 10% off by pledging to reduce waste”) raised ethical purchases by 22% without causing a loss in profit [36]. Therefore, Patagonia can adopt a tiered pricing approach: lower prices for customers who participate in sustainability initiatives (e.g., carbon offset pledges). In addition, using real-time feedback (e.g. “Your eco-actions saved \$15—apply this discount now”) is also a realistic approach.

Moral licensing arises when consumers overestimate the ethical impact of a single purchase, leading to compensatory harm [28]. Transparent metrics (e.g., carbon savings per product) disrupt this bias by emphasizing incremental progress. As a result, the policy can mandate standardized eco-labels on products (e.g., water saved, emissions reduced) or make the brand provide post-purchase dashboards showing the cumulative environmental impact of customers (e.g., “Your purchases saved 50kg CO2 this year”).

5. Conclusion

5.1. Summary of Phenomenon Analysis

Netflix's auto-renewal methodology deliberately takes use of sunk cost fallacies, which justify previous payments, and loss aversion, which is the fear of losing customized content. Transparent reminders and flexible cancellation are two behavioral treatments that might balance business profitability with the interests of customers.

TikTok's live commerce strategy encourages impulsive buying by taking use of sunk cost fallacy (time or attention investment) and loss aversion (fear of missing out). Although these strategies increase sales, they run the danger of causing financial hardship and consumer regret. Regulations like cooling-off periods and stock level disclosure might match platform revenues with moral consumer protection.

Patagonia's green premiums unintentionally lead to sunk cost fallacies (overcommitment to justify pricing) and loss aversion (seeing sustainability as a financial penalty). Moral licensing has the danger of compromising more general environmental aims, even while its mission-driven approach encourages devotion. Consumer behavior may be brought into line with Patagonia's sustainability philosophy through interventions like effect disclosure and circular incentives.

5.2. Research Impact

By examining how loss aversion and sunk costs are used in the marketing tactics of Netflix, TikTok, and Patagonia, this article highlights the significance of behavioral economics in the actual business world. It also emphasizes how important sunk costs and loss aversion are to future economic behavior.

The cases of Netflix, TikTok, and Patagonia demonstrate how digital and sustainable business models systematically exploit loss aversion and sunk cost fallacies to drive profits, often at the expense of consumer welfare. Netflix and Amazon use auto-renewal and prepayment traps to lock users into subscriptions, exploiting perceived losses and irrational justifications of prior payments. TikTok's live commerce amplifies impulse buying through artificial scarcity and time-sensitive pressure, exploiting sunk costs of viewer attention. Patagonia's green premiums can lead to moral licensing, where ethical purchases encourage unsustainable behavior, potentially undermining environmental goals.

These practices highlight a tension between profit maximization and ethical design, with behavioural biases often leading to consumer regret, financial harm, and unintended ecological trade-offs. It can be seen that for these marketing behaviours that may lead to vicious market development, platforms, brands, and governments should take joint action to protect consumer rights and promote a virtuous cycle in the market.

5.3. Future Prospects

To align corporate incentives with consumer and planetary welfare, interdisciplinary solutions are critical.

Firstly, the government should strengthen regulatory intervention. Improving transparency mandates (e.g., real-time inventory disclosures on TikTok, carbon footprint labels for Patagonia) could mitigate the exploitation of loss aversion. Also, cooling-off periods and transparency of sunk costs could disrupt sunk cost-driven retention in subscription and prepayment models.

Moreover, platforms and governments should strengthen education for customers, advocate for rational consumption and on-demand purchases, and reduce wasteful consumption caused by irrational impulse consumption. At the same time, attention should also be paid to the correct guidance of minors' views on money and consumption. Due to the insufficient physical and mental development of minors, they lack the ability to make comprehensive and right behavioral judgments. Under the effect of emotional excitement in commercials, minors are more prone to neglect long-term implications.

During the research process, this paper specifically studied four typical cases from various fields to explain the practical application of loss aversion and sunk costs. However, there are still many vicious marketing problems in the market that exploit customer psychology. For example, the prepayment mechanism and gift card discount mechanism of some shopping platforms. At the same time, the government and platforms also need to find more effective ways to guide customers' consumption behaviour correctly, which is indispensable for a positively developing market.

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