

Research on the Psychological Mechanism and Addiction Logic of Blind Box Consumption from the Perspective of Behavioral Economics

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Abstract. The blind box economy, characterised by the notion that "everything can be a blind box," has transformed the purchasing behaviour of younger consumers. Emerging from Japan's "lucky bags" and evolving in China via brands like Pop Mart, it has matured into a "IP + blind boxes" model. In 2024, China's market size attained 5.944 billion yuan, while the global market size reached 19.151 billion yuan. The consumption of blind boxes has evolved from fashionable toys to include sectors such as catering, beauty, and cultural tourism, so creating a more extensive "blind box +" economy. This article employs literature review and theoretical analysis from behavioural economics, neuroeconomics, and consumer psychology, utilising frameworks such as variable reward theory, prospect theory, and commodity theory to investigate psychological mechanisms and decision-making logic. The study examines three enquiries: the factors contributing to the allure of blind boxes, the impact of scarcity techniques on purchasing behaviour, and the parallels to gambling along with associated social concerns. Findings indicate that dopamine reactions to fluctuating rewards, cognitive distortions stemming from scarcity, and identity affirmation through social engagement collectively generate an impulsive and gambling-like cycle of "consumption–display–exchange." The research finds that the effectiveness of blind boxes demonstrates firms' utilisation of cognitive biases and necessitates a balance between corporate optimisation and macro-level regulation to enhance consumer engagement while mitigating addiction concerns.

Keywords: News source credibility, Misinformation detection, Multimodal analysis, Social network modeling, Explainable AI

1. Introduction

The blind box economy has witnessed explosive growth in recent years and has become an important phenomenon in the new consumption sector. The global surprise box market is expected to reach 14.72 billion US dollars in 2025 and grow to 26.66 billion US dollars by 2035 [1]. In the Chinese market, brands such as Pop Mart have transformed previously niche, trendy toys into a billion-dollar consumer sector through the "blind box + IP" model. It is notable that over 52% of young consumers actively prefer blind-box purchases, and 38% are influenced by cross-border

collaborations with entertainment brands [2]. The rise of this consumption phenomenon coincides with a period of slowing macroeconomic growth and declining traditional investment returns - the one-year deposit interest rate of banks first fell below 1% in 2025, and residents' demand for "low-cost dopamine" emotional compensation has increased [3]. This article explores the psychological mechanisms underlying blind box consumption from a behavioral economics perspective. The core feature of blind boxes is "uncertainty" - consumers cannot predict the specific products inside the box when purchasing. This characteristic challenges the traditional economic assumption of "certainty preference" and raises a key question: Why do consumers find uncertainty attractive? This article will systematically analyze the behavioral economic principles behind blind box consumption, including variable reward mechanisms, scarcity effects, and the influence of social interaction on consumption decisions. Additionally, this study employs literature review and theoretical analysis, integrating the core theories of behavioral economics [4] and neuroscientific discoveries [5] to provide a cross-disciplinary interpretation of the blind box consumption phenomenon. By reviewing the latest empirical studies at home and abroad [6, 7], an integrated analysis framework for blind box consumption behavior is constructed. Theoretically, this study helps to expand the application boundaries of behavioral economics in new consumption models and deepen the understanding of the psychological mechanism of "uncertainty consumption". In practice, the research conclusions can provide a theoretical basis for optimizing the marketing strategies of blind box enterprises and serve as decision-making references for regulatory authorities to prevent excessive addiction risks.

2. Variable rewards: the neuroeconomics foundation of box-consumption

The variable-reward mechanism is the neural foundation of the appeal of blind box consumption. Compared with fixed rewards, variable rewards (i.e., uncertain rewards) can trigger stronger dopamine secretion. From the perspective of neural mechanisms, dopamine is not a "happiness hormone" but rather a "prediction error signal": the greater the difference between the actual and expected rewards, the higher the firing frequency of dopamine neurons. The random drop rate of blind boxes (e.g., the probability of a hidden item being 1/144) maximally amplifies prediction error, leading to significantly higher dopamine pulse amplitude in the nucleus accumbens than in predictable reward scenarios [5]. At the same time, the reward structure of blind boxes has a "guaranteed" nature: even if the target item is not drawn, consumers can still receive an actual product, which significantly reduces consumers' expected loss perceptions and lowers the psychological threshold for purchasing decisions. In other words, blind box enterprises remove the "all-loss" option from the decision set, ingeniously avoiding the loss aversion effect described by prospect theory, making consumers more willing to continue participating. Secondly, the reward value of surprise boxes follows a "long-tail distribution": a very few hidden items have extremely high values (up to 10-20 times the purchase price). In contrast, the majority of ordinary items have values lower than the purchase price. This distribution structure precisely aligns with human psychological preferences for "small probability high gain" events, and consumers often overestimate the possibility of drawing a hidden item, forming an "overly optimistic" cognitive bias.

Brain research further reveals the neurophysiological basis of this mechanism. When consumers make a purchase decision about blind boxes, the N2 component (reflecting cognitive conflict) shows an enhanced negative wave in the frontal lobe region, indicating that they experience decision-making conflicts when processing scarce information. The amplitude of the P300 component (reflecting attention resource allocation) significantly increases under supply-type scarcity

conditions, indicating that scarce information captures consumers' attention resources. The late positive potential (LPP) peaks around 600ms, reflecting an increase in emotional arousal [5].

From a behavioral perspective, the variable-reward mechanism forms a "cue-action-variable reward-dopamine peak-memory consolidation-desire-cue" closed loop. Visual/IP cues trigger purchase impulses, and after the purchase, consumers randomly receive products of different values. The dopamine peak strengthens the memory connection, and the next time the cue appears, the dopamine system is pre-activated, generating a desire for repeat purchases (Liu Shen & Chen Keixin, 2025). This mechanism makes blind box consumption highly sticky, and its underlying logic is similar to the design principle of gambling devices such as slot machines: by precisely "hijacking" the neural reward system. Blind box consumption creates behavioral dependence beyond that of general commodity consumption.

3. Scarcity strategy: the dual paths of supply-based and demand-based scarcity

Scarcity strategies in blind box marketing can be divided into two types: supply-based and demand-based. Supply-based scarcity occurs when merchants create scarcity by controlling the quantity (e.g., limited releases of hidden editions). In contrast, demand-based scarcity stems from the perception of a resource shortage caused by excessive consumer demand (e.g., a rush to purchase popular editions) [7]. However, it should be noted that blind box enterprises often employ both of these scarcity policies simultaneously, and the two reinforce each other, jointly enhancing consumers' purchasing impulse.

The Commodity Theory states that the unavailability of a commodity is positively correlated with its perceived value [8]. Supply-based scarcity stimulates consumers' unique demand by conveying "high-end attributes": owning a scarce product enables them to differentiate themselves from others and fulfill the need for self-expression. Neuroscientific studies indicate that for pleasure-driven products (as IP figurines), supply-induced scarcity elicits more emotional arousal and attentional focus compared to demand-induced scarcity, as seen by a notable rise in P300 amplitude [5]. This finding provides important insights for the marketing strategies of blind box enterprises: For consumers seeking emotional satisfaction, emphasizing the product's scarcity is more likely to stimulate purchasing desire than creating a rush-to-buy atmosphere.

Demand-based scarcity activates the herd effect through a "competitive atmosphere". When consumers observe many others rushing to purchase the same product, they may experience the "fear of missing out" (FOMO), prompting them to make quick decisions to avoid social comparison disadvantages. The Regulatory Focus Theory posits that preventive-oriented consumers are more inclined to purchase under conditions of demand-based scarcity. In contrast, promotion-oriented consumers are more inclined to purchase under supply-based scarcity conditions [7].

The Accessibility-Diagnosticity Theory further explains how scarce information affects decision-making: accessibility (such as transparency into the probability of hidden editions) and diagnosticity (effectiveness in decision-making) jointly influence purchase judgments. When the probability information is transparent, consumers' cognitive evaluation of scarcity is more rational; otherwise, it may lead to excessively optimistic expectations [9]. However, in reality, blind box enterprises often deliberately blur the concept information and replace precise data with vague expressions such as "the probability of hidden editions is extremely low", which actually exploits consumers' cognitive errors regarding uncertain information.

4. Social interaction and identity recognition: the social dimension of blind box consumption

Blind box consumption is both an individual behaviour and a consequence of social interaction. The Interaction Ritual Chains theory offers a framework for comprehending the social dynamics of blind box consumers, comprising four elements: collective gathering, boundary formation, shared symbol library, and emotional connection, which collectively influence the consuming ritual [6]. The social dimension of blind box consumption presents three interrelated levels: first, the community interaction before consumption - consumers obtain information and exchange strategies through social media, offline stores, etc., forming a common expectation; second, the ritualistic behavior during consumption - opening boxes, sharing experiences, exchanging, etc., themselves constitute a social performance; finally, the identity construction after consumption - owning a specific blind box product becomes a symbolic symbol of a subculture identity.

From the perspective of subculture, blind box consumers have formed a unique "kinship group". They build group boundaries and identity recognition through offline queue purchases, online sharing and posting, second-hand transactions, etc. The blind box product itself becomes "subcultural capital" - consumers distinguish "insiders" and "outsiders" by owning different types and series of blind boxes, and further differentiate taste levels within the circle [6]. This phenomenon closely aligns with Bourdieu's cultural capital theory. In the field of blind box consumption, the cognition and possession of specific IPs and rare styles serve as symbolic tools for class distinction. This means that the appeal of blind box consumption comes not only from the product itself but also from its role as a social identity marker.

Social media has amplified this process. The #Labubu topic on TikTok has over 1.4 million views, and Xiaohongshu focuses on exquisite collection sharing [10]. Opening box videos broadcast the "winning peak" of individuals to potential players; likes and comments serve as external dopamine boosters. The celebrity effect further reduces the social risk of "taking a gamble" - celebrities like Rihanna and Dua Lipa's street shots of the same style give blind boxes a trendy identity label [3]. Behind this phenomenon is the reinforcing effect of social rewards on consumption behavior: when consumers post rare styles on social media, the likes and comments they receive are essentially a form of social currency, which, combined with the satisfaction the product itself provides, creates a stronger positive feedback loop.

Secondary-market premiums provide a "wealth feedback loop" for blind-box consumption. Hidden editions have a 10-20x premium on second-hand platforms, converting "good luck" into tangible real-currency rewards [11]. This complete loop of "consumption - showing off - transaction" upgrades the original simple consumption behavior into a compound behavior with investment attributes. The existence of the secondary market enables some consumers to view blind boxes as investment products, expecting to profit from resale, further intensifying the irrationality of consumption.

5. Addictive behavior analysis: the boundary between bonanza boxes and gambling

The addictive nature of blind box consumption has raised widespread concerns. Blind boxes structurally resemble gambling through several fundamental components: unpredictable payouts, near-loss phenomenon, sunk cost fallacy, and the incentive mechanism for ongoing engagement. The operational mechanics of these factors in blind box consumption resemble those in gambling; nonetheless, significant distinctions exist.

The near-loss effect (Near-Miss) refers to consumers encoding their failures as "almost success" when they "almost win", maintaining a positive expectation. The "two ordinary models + one hidden

model pattern" pattern in blind box draws is similar to near-loss feedback in slot machines, significantly enhancing the persistence of behavior. The sunk cost effect is manifested as "after 8 draws, one more time must win" - the already invested costs increase the subjective probability of winning, self-justifying the continuation of investment [10]. From a cognitive psychology perspective, these two effects jointly point to the human belief bias that "effort must lead to reward": consumers tend to believe that, since they have invested so much time and money, it's their turn. This bias is very similar to the gambler's fallacy: people mistakenly believe that the probability of independent events changes based on historical results.

From a cognitive standpoint, blind box consumption elicits three psychological illusions: the illusion of control (actions like forcefully shaking the box or selecting a specific corner impart a sense of agency), over-optimism (exaggerating the likelihood of success), and the availability heuristic (instances of winning showcased on social media are more readily remembered). These cognitive biases cumulatively result in unreasonable decisions. These biases present a self-reinforcing cycle in blind box consumption: when consumers see winning cases on social media, the availability heuristic makes them overestimate the probability of winning; the overestimated probability further strengthens the purchase intention; even if they don't win after purchasing, the near-loss effect maintains a positive expectation.

However, blind boxes and gambling have key differences: blind box consumers always receive physical products (even non-target models), while gambling may result in complete loss of investment; the "prizes" of blind boxes have secondary market channels for redemption, while gambling chips usually can only circulate within the casino; blind box consumption is embedded in daily consumption scenarios, and its addiction risk threshold is lower than specialized gambling behavior. However, both utilize the sensitivity of the human brain to uncertain rewards - as the research indicates, the blind box economy, due to its structural similarity to gambling, may lead to financial losses, emotional distress, and even suicidal thoughts [10]. From a policy standpoint, the regulation of the blind box economy should be predicated on its intermediate characteristic of being "semi-gambling" yet "non-gambling," necessitating the formulation of targeted regulatory measures: on one hand, compulsory disclosure of probability information, the imposition of a single purchase limit, and the restriction of purchases by minors can effectively mitigate addiction risks; on the other hand, excessive regulation must be eschewed to avoid suppressing the innovative potential of blind box enterprises.

6. Conclusion

This paper systematically analyzes the psychological mechanisms and addictive logic of blind box consumption from a behavioral economics perspective. The study finds that the appeal of blind box consumption primarily stems from the intense secretion of dopamine triggered by the variable reward mechanism, that is, the uncertain rewards amplify the prediction errors, causing the brain reward system to be activated more strongly than fixed rewards [5]; secondly, the scarcity strategy affects consumption decisions through two paths: the supply type and the demand type. The former addresses consumers' distinct requirements, whilst the latter stimulates the herd effect and FOMO psychology, which are pertinent to hedonic and utilitarian product contexts, respectively [7]. Moreover, blind box consumption has addictive characteristics similar to gambling, including the near-loss effect, the sunk cost trap, and the self-reinforcing loop of "consumption - showing off - transaction", but due to the continuous provision of physical products, the addiction threshold is relatively low [6, 10]. This study's theoretical contribution consists of synthesising neuroeconomics, behavioural decision theory, and consumption sociology to develop a multi-level analytical

framework for blind box consumption. Practically, it encourages enterprises to prioritise consumer well-being, mitigate excessive dependence on cognitive biases that lead to irrational consumption, and offers guidance for regulatory bodies to enhance probability information disclosure, implement cooling-off periods for consumption, and establish limits on youth consumption.

This study has the following limitations: Firstly, it mainly relies on secondary literature and theoretical analysis, lacking support from first-hand empirical data; Secondly, it lacks tracking research on the long-term impact of blind box consumption (such as addiction conversion rate, financial consequences); Thirdly, the differences in consumption mechanisms of different product types (such as pop culture blind boxes, beauty blind boxes, food blind boxes) have not been fully explored. Future research can conduct large-sample questionnaires and behavioral experiments to measure individual differences in consumers' cognitive biases and impulsive purchases, track the long-term behavioral patterns of blind box consumers to identify key predictors of addiction risk, and conduct cross-national comparative studies to explore the influence of cultural factors on blind box consumption. In addition, with the emergence of new forms such as NFT and metaverse blind boxes, the consumption mechanism in the digital blind-box environment also warrants further attention.

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