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How Game Design Incentivize Heavy Engagement and Over Consumption

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Abstract: In the digital age, the widespread popularity of smart products has significantly boosted the number of users of games, making them more accessible and diverse. This paper explores the intersection of behavioral economics and game design, focusing on how psychological principles can be used to motivate player engagement and spending. By analyzing key concepts such as loss aversion, the sunk cost fallacy, immediate versus delayed rewards, and social comparisons, this article demonstrates the principle that drive the success of modern gaming platforms. Using case studies, this paper shows how these principles influence player behavior and improve engagement and profitability. These findings highlight the critical role of behavioral economics in shaping the gaming experience and provide insights for developers and marketers aiming to sustain user growth and revenue. Future research could delve into the ethical implications of these mechanisms and their long-term implications for consumer behavior.

Keywords: Behavioral Economics, Game Design, Player Engagement, Sunk Cost Fallacy, Incentive Mechanism.

1. Introduction

Under the wave of the digital age, the popularization of smart products has broken the restrictions of traditional games, greatly reduced the barriers for people to enter the game world, and made games more accessible, diverse and flexible. Against this backdrop, games have gone from simple pastimes to immersive universes, attracting a large number of players across the globe[1]. Gaming has quickly gone from a niche hobby into one of the biggest markets in the entertainment industry. In 2015, the number of active players worldwide was 2.03 billion and has continued to grow ever since. In 2024, the number of active players worldwide has reached 3.32 billion. The gaming market has a current valuation of $282 billion. And numbers continue to grow with each passing year. By 2027, the gaming industry is set to be worth over $363 billion[2].But why should people invest not only time but also money in these virtual realms? The answer lies at the intersection of psychology and economics, behavioral economics.

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Table 1: Global active game players over time

Year	Number of Gamers	Increase Over Previous Year	Increase Over Previous Year (%)
2015	2.03 billion	-	-
2016	2.17 billion	140 million	6.90%
2017	2.33 billion	160 million	7.37%
2018	2.49 billion	160 million	6.87%
2019	2.64 billion	150 million	6.02%
2020	2.81 billion	170 million	6.44%
2021	2.96 billion	150 million	5.34%
2022	3.09 billion	130 million	4.39%
2023	3.22 billion	130 million	4.21%
2024	3.32 billion	100 million	3.11%

(Source: Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, *25*(2), 383–417. https://doi.org/10.2307/2325486)

2. Behavioral Economics

A discipline that incorporates insights from psychology into traditional economic theory, offers a unique lens through which to understand the motivations behind human decisions in game Settings. As players navigate the virtual world, they are presented with a large number of choices, each designed to elicit specific actions and reactions. From in-game purchases to time investments, game development uses a myriad of strategies based on the principles of behavioral economics to influence player behavior.

This paper aims to explore the intricate interplay between behavioral economics and games, with a particular focus on how these principles can be used to motivate users to invest more time and money in the context of games. Through the analysis of real-world examples and theoretical frameworks, in-depth research on the psychological mechanisms that support player engagement and spending will be conducted to gain a deeper understanding of the strategies that drive the success of modern game platforms and provide recommendations for business development and user use.

3. Incentive Mechanism

In game design, developers often use the principles of behavioral economics to design mechanisms that motivate players to engage and spend. Here are some common mechanics used in games:

3.1. Loss Aversion

Loss aversion states that individuals respond more strongly to losses than to equivalent gains when faced with both losses and gains.

Specifically, loss aversion refers to the tendency to avoid losses more strongly than to pursue equivalent gains. This means that the pain of losing a given amount is usually greater than the pleasure of gaining the same amount.

This psychological tendency can influence decision-making behavior, making people more inclined to take loss-avoiding actions. Loss aversion is often used in games to increase engagement and retention by designing mechanisms to make players feel the potential threat of loss

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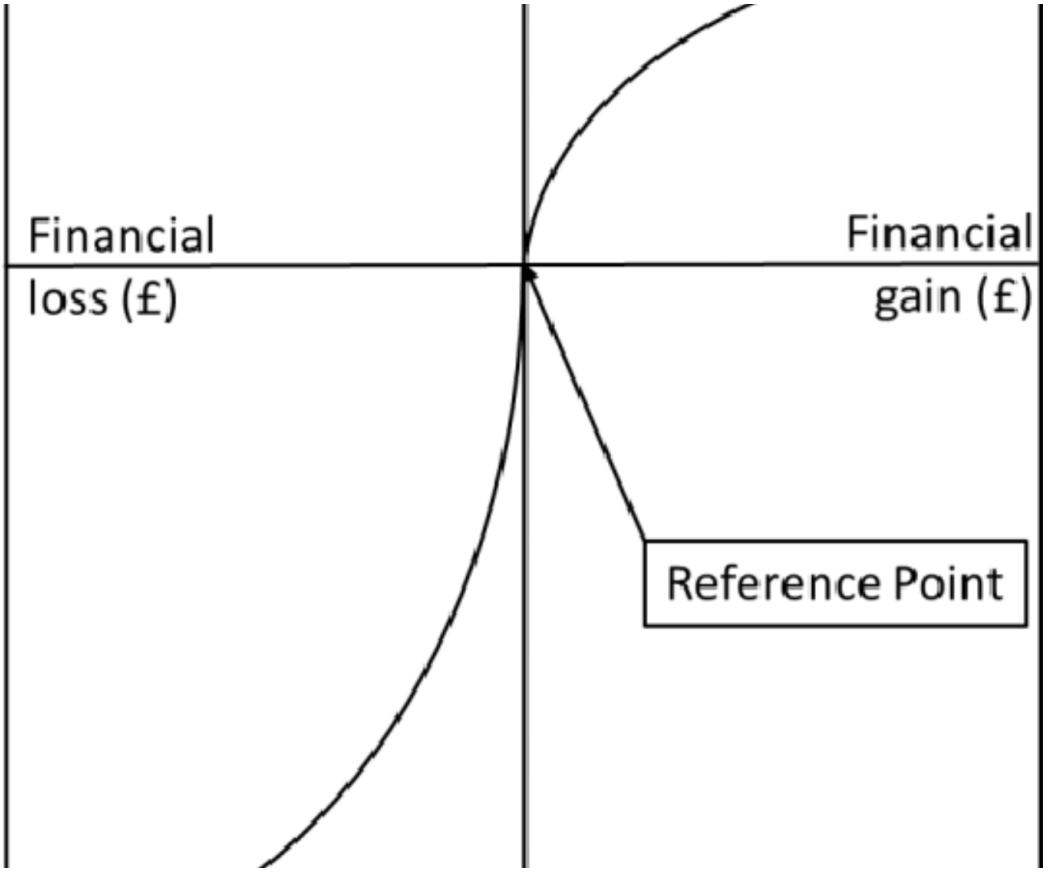

Figure 1: The prospect theory 'S-curve' shows the difference in perceived magnitude of losses and gains (adapted from Kahneman & Tversky 1979)

Case of Game: In Honor of Kings, players can receive rewards every day they log in. The more days they log in, the richer the reward will be. On the seventh day, there will be a grand prize. This design exploits players' fear of losing their accumulated rewards, prompting them to log in every day.

3.2. The Sunk Cost Fallacy

The sunk cost fallacy is a cognitive bias that makes you feel as if you should continue pouring money, time, or effort into a situation since you've already 'sunk' so much into it already. This perceived sunk cost makes it difficult to walk away from the situation since you don't want to see your resources wasted[3]. The sunk cost fallacy is used in games to lengthen players' playing time and increase players' willingness to spend, prompting them to invest more resources in the game.

Case of Game:

"Clash of Clans" is a popular mobile strategy game developed by Super-cell. The game encourages players to build and upgrade their villages, train troops, and attack other players to earn resources. The sunk cost fallacy comes into play as players invest significant amounts of time and money into upgrading their villages and troops[4].

Example Scenario:

A player has spent $200 and countless hours upgrading their village to a high level. Despite feeling bored or frustrated with the game, they continue to play and spend money because they don't want their previous investments to go to waste. This leads them to invest even more resources, perpetuating the cycle of the sunk cost fallacy.

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3.3. Immediate vs. Delayed Rewards

The concepts of immediate and delayed rewards play a crucial role in maintaining engagement and interest in various activities, including game design and personal development. Immediate rewards provide instant gratification right after accomplishing a task, catering to short-term satisfaction. In contrast, delayed rewards, which require sustained effort and are received over a longer period, often hold greater value and contribute to long-term goals. This blend of reward types can enhance motivation by satisfying both the desire for quick gains and the pursuit of more substantial, enduring achievements[5].

Case of game: "Honor of Kings"

"Honor of Kings" is a popular multiplayer online battle arena (MOBA) game developed by Tencent. The game effectively uses both immediate and delayed rewards to maintain player engagement and interest.

Immediate Rewards Example:

In each game session, players receive immediate rewards such as in-game gold and experience points for completing tasks like killing enemies or destroying towers. These immediate rewards provide instant gratification and motivate players to keep playing. Meanwhile, these rewards serve as a foundational layer that encourages short-term engagement, setting the stage for players to invest more time and resources in pursuit of longer-term goals and achievements within the game. This dual reinforcement—immediate satisfaction coupled with the anticipation of future rewards—creates a compelling loop that keeps players invested in the game.

3.4. Social Comparison and Competition

Social comparison and competition are key psychological mechanisms that motivate players in games. Social comparison involves individuals evaluating their behaviors, abilities, and achievements by contrasting themselves against others. Competition enhances a person's sense of achievement by vying with others for resources, status, or honor. In gaming contexts, features like leader-boards, achievement systems, and multiplayer combat allow players to see the gaps between themselves and others, thus stimulating their competitive psyche and increasing the game's attractiveness and engagement.

Furthermore, according to existing research, social comparison and competition can enhance individuals' sense of self-efficacy and their willingness to continue engaging in online social games. This mechanism indirectly affects players' intentions to continue playing by influencing the self-efficacy and expectations within the online gaming environment[6].

Case of game: Game "Fortnite"

"Fortnite" is a widely popular battle royale game developed by Epic Games. The game incorporates features of social comparison and competition to enhance player engagement and motivation.

Social Comparison Example: In "Fortnite," players can compare their performance with others through leaderboards and detailed statistics. These features allow players to see their rankings, win rates, and other metrics, which fosters a competitive environment. For instance, players may strive to improve their ranking by comparing their stats with those of their friends or top players globally[7].

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Competition Example: The competitive nature of "Fortnite" is highlighted through its multiplayer combat system, where players compete against each other to be the last person or team standing. The game frequently hosts tournaments and special events with significant rewards, further driving players' desire to compete and achieve higher status within the game community[7].

3.5. Effect of Anchoring

In game design, the anchoring effect can be strategically employed by initially setting high prices or high difficulty levels for games or in-game items. This initial setting acts as an 'anchor' that significantly influences players' subsequent perceptions and decisions. For instance, if the first price a player sees for an in-game item is high, any subsequent price drop or discount is perceived as a better deal, even if the new price is still relatively high. This psychological effect makes subsequent options that are cheaper or easier seem more favorable in comparison, thereby guiding players' purchasing behaviors and enhancing engagement and satisfaction[8].

Case of Game: "Genshin Impact".

"Genshin Impact" is an open-world action role-playing game developed by miHoYo. The game utilizes the anchoring effect to influence player purchasing behavior and enhance engagement[9].

Anchoring Example:

In "Genshin Impact," the initial prices for in-game currency and rare items are set relatively high. For instance, the game offers a pack of in-game currency called "Genesis Crystals" at different price points, with the highest-priced pack being prominently displayed. This high price acts as an anchor, making subsequent lower-priced packs appear as better deals. When the game offers discounts or promotional prices, players perceive these deals as more valuable because their reference point is the initial high price.

3.6. Limited Time Discount

A price discount has a positive influence on perceived savings. Game consumers' perceived savings increase as the price discount increases. This positive relationship is underpinned by the price–quality–value model, which suggests that price is viewed as a sacrifice and a discount as a gain[10].

Limited-time discounting is a strategy to stimulate consumption by setting a time limit. This strategy exploits the fear of missing out by creating a sense of urgency through a limited-time offer, forcing players to make a purchase decision in a short period of time. The design of the limited-time discount makes players feel the loss of not taking the opportunity within a limited time, thus increasing their spending impulse and decision-making speed.

Case of game "Peace Elite"

In Peace Elite, players can purchase special items through a limited time offer. These discounts give the player a sense of urgency and reduce their thinking time to make a quick purchase decision, thus enjoying the discount. For example, during special events or holidays, the game will introduce mechanisms such as top-up extra rewards or discounted prices. This strategy exploits the fear of missing out, prompting players to spend more to avoid missing trades.

3.7. Lottery Mechanism

The lottery mechanism is to stimulate the player's desire to participate by introducing uncertainty and expected value. In the face of uncertain outcomes, people tend to have expectations of possible high-value returns, which drives them to participate in the lottery.

In a game of chance, if multiple outcomes are possible, each with defined probabilities, the expected value can be calculated as the sum of the products of these outcomes and their probabilities.

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This mathematical expectation reflects the average amount one might anticipate winning if the game were played repeatedly over time.

This notion emphasizes that while a specific outcome, like winning a certain amount, might not be guaranteed in any single game iteration, over time the aggregated results will converge towards the expected value. This is fundamental in designing games, including lotteries, as it taps into the player's psychological engagement with risk and reward, driving their continued participation[11].

By leveraging behavioral economics principles, these mechanisms successfully motivate heavy participation and overspending, thereby increasing the game's attractiveness and profitability.

Case of game: Honor of Kings uses a lottery system called the Glory Crystal Lottery, where players can use money in the game to draw prizes for rare items and skins. This system introduces uncertainty and stimulates the player's desire to participate. In a lottery, players spend a certain amount of in-game or real money in a lottery for a chance to get a rare item. Each draw has a defined probability of producing a different item, with the rareest item having the lowest probability. In addition, the probability of the rarest items will gradually increase, and the expectation value will always increase, thus promoting players to recharge consumption.

4. Conclusion

In this paper, we explore the application of behavioral economics to game design. By applying the principles of behavioral economics, such as loss aversion, the sunk cost fallacy, and immediate versus delayed rewards, developers can create experiences that both engage and keep players engaged. These strategies have been very effective in driving continued player engagement and increased spending, which has led to significant growth in the gaming industry. This paper demonstrates that the conscious application of behavioral economics principles can significantly influence player behavior, prompting continued participation and increased spending. Games are no longer just about entertainment; They become sophisticated platforms that blend psychological insights and economic theory to drive player investment and maximize profit. Future research could explore the long-term effects of these mechanisms on consumer behavior and their implications for ethical game practice. As the gaming industry continues to evolve, understanding these complex dynamics is critical for developers and marketers in order to sustainably grow their audiences and revenues.

References

[1] *Magerkurth, Carsten, Adrian David Cheok, Regan L. Mandryk, and Trond Nilsen(2005). Pervasive Games: Bringing Computer Entertainment Back to the Real World. https://dl.acm.org/doi/abs/10.1145/1077246.1077257.*

[2] *Howarth, Josh(2024). How Many Gamers Are There? (New 2024 Statistics). https://explodingtopics.com/blog/number-of-gamers.*

[3] *Gould, Wendy Rose(2023). The Sunk Cost Fallacy: How It Affects Your Life Decisions. https://www.verywellmind.com/what-is-sunk-cost-fallacy-7106851.*

[4] *Steven Tweedie(2015). Why 'Clash Of Clans' is so incredibly popular, according to a guy who plays 16 hours a day. https://www.businessinsider.in/why-clash-of-clans-is-so-incredibly-popular-according-to-a-guy-who-plays-16-hours-a-day/articleshow/49621105.cms*

[5] *Hariri, Ahmad R., Sarah M. Brown, Douglas E. Williamson, Jannie D. Flory, Harriet de Wit, and Stephen B. Manuck(2006). Preference for Immediate over Delayed Rewards Is Associated with Magnitude of Ventral Striatal Activity. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6675016/.*

[6] *Mildawani, M.M. Tri Susetyaning, Tri Ratna Murti, Anastasia Sri Maryatmi, and Juneman Abraham. "A Psychological Model of Competitive Behavior: Social Comparison as a Mediator of the Critical Thinking, Self-Efficacy, and Adaptation Ability Prediction Among College Students." 2022. Accessed September 23, 2024. https://websites.umich.edu/~smgarcia/pubs/Social_Comparison_and_Competition.pdf.*

[7] *Leaderboards: Climbing the Social Gaming Leaderboards: Strategies for Success(2024). https://fastercapital.com/content/Leaderboards--Climbing-the-Social-Gaming-Leaderboards--Strategies-for-Success.html.*

[8] *Caceres-Santamaria, Andrea(2021). The Anchoring Effect. https://www.stlouisfed.org/publications/page-one-economics/2021/04/01/the-anchoring-effect.*

DOI: 10.54254/2754-1169/135/2024.18719

[9] *Miao Xindan(2023). Anchoring Effect and People's Behaviour Decision Making: A Case Study. https://www.researchgate.net/publication/370705125_Anchoring_Effect_and_People's_Behaviour_Decision_Making_A_Case_Study.*

[10] *Lee, Jung Eun, and Jessie H. Chen-Yu(2018). Effects of Price Discount on Consumers' Perceptions of Savings, Quality, and Value for Apparel Products: Mediating Effect of Price Discount Affect. https://fashionandtextiles.springeropen.com/articles/10.1186/s40691-018-0128-2.*

[11] *S. Antons, M. Liebherr, M.Brand, A.Brandtner(2023). From game engagement to craving responses – The role of gratification and compensation experiences during video-gaming in casual and at-risk gamers. https://www.sciencedirect.com/science/article/pii/S2352853223000421*