

How Loot-Box Dark Patterns Cause Service Failure and Erode Player Trust in Games

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INTRODUCTION

Loot boxes are among the most lucrative and most contested monetization mechanisms in digital games and have long been studied as a gambling-like harm linked to problem gambling (Brooks and Clark 2022; Zendle et al. 2019). Yet most players who dislike loot boxes are not problem gamblers. Their bad experiences—opening a box only to receive a worthless duplicate, discovering that the odds were opaque, or feeling pressured by a limited-time offer—are better understood not as clinical harm but as consumer harm. Building on research that defines the loot box itself as a dark pattern (Chen et al. 2026; Petrovskaya and Zendle 2022), we reframe the problem these dark patterns create not only as a gambling-like or social harm but also as a service failure—a service whose manipulative design falls short of what players legitimately expect (Bitner et al. 1990; Smith et al. 1999)—eroding how players evaluate the game and its operator.

Two research streams inform this reframing yet have developed largely in isolation. In marketing and information systems, dark patterns reliably reduce trust and brand attitude through perceived manipulation and perceived unfairness (Kim et al. 2023; Riquelme et al. 2019; Voigt et al. 2021; Witte et al. 2025). In gambling psychology, the chance structure itself—near-misses, losses, and outcomes appraised as unfair—produces frustration, regret, and anger (Stange et al. 2016; Wu and Clark 2015). However, no study integrates these cognitive and affective mechanisms in the loot-box context, and, to the authors' knowledge, none has modeled loot-box dark patterns as a service failure that erodes player trust and perceived service quality. We develop and test a structural model of loot-box dark patterns as a service failure eroding player trust and game attitude.

RESEARCH MODEL

We propose a stimulus–organism–response model (Figure 1) in which loot-box dark patterns operate as a service failure. Perceived loot-box dark patterns—a stimulus modeled as a bundle of six dimensions—shape two parallel organismic states: cognitive appraisals (perceived manipulation and perceived unfairness; H1) and negative emotions (frustration, regret, and betrayal; H2). Drawing on information manipulation theory, equity theory, and the service-failure literature, these appraisals in turn reduce service trust (H3) and game attitude—a perception of service quality (H4)—while a parallel affective route runs from negative emotions to service trust (H5) and game attitude (H6). Service trust and game attitude should, in turn, shape behavioral intentions—continuance, in-game spending, and recommendation. We will test the model with a cross-sectional online survey of approximately 300 adult game players in China, one of the largest loot-box and gacha markets, who have opened a loot box within the past six months. Each respondent will anchor all measures to a single self-nominated reference game—the game on which they spent the most on loot boxes (or opened most frequently, if they spent nothing)—selected from the top 16 loot-box games in China, with an open-ended option for other titles. We will code each game’s loot-box type and game characteristics as covariates for design heterogeneity. Perceived loot-box dark patterns will be modeled as a second-order formative construct comprising reflective dimensions (currency obfuscation, probability opacity, false scarcity, sunk-cost pressure, variable-reward framing, and pay-to-win) adapted from established deceptive-design scales and taxonomies (Brignull 2010; Mathur et al. 2019). Perceived manipulation, perceived unfairness, negative emotions, service trust, game attitude, and behavioral intentions will be captured with established multi-item reflective scales. To focus on ordinary game players, we will exclude problematic gamers using the PGSI-SF index (Volberg and Williams 2012). Data will be analyzed with partial least squares structural equation modeling (PLS-SEM), assessing the measurement model (reliability, convergent and discriminant validity, formative VIF and outer weights) and the structural model (bootstrapped path and mediation effects). Data collection and analysis will be completed before the conference.

The study offers three contributions. Conceptually, it reframes loot-box harm as a service failure and a consumer-trust problem that complements the dominant problem-gambling lens, treating the loot box as a bundle of dark patterns rather than a single chance-based product. Theoretically, this study integrates the cognitive route established in marketing research and the affective route established in gambling research under a single higher-order account—service failure—in which manipulative design violates the legitimate expectations players hold toward a game service. Practically, it shows publishers and regulators how exploitative monetization can backfire on trust and loyalty across ordinary players. Beyond informing regulation, these findings can help firms recognize the potential losses hidden in manipulative monetization and build more sustainable business models.

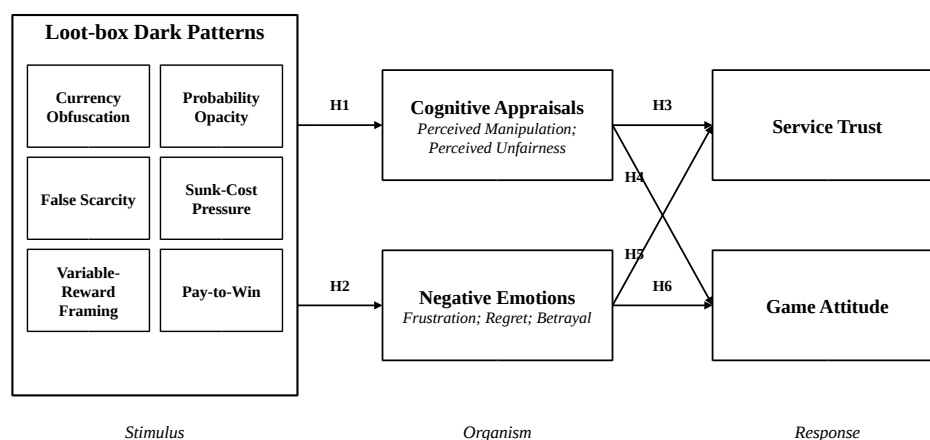


Figure 1. Proposed Research Model

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BIO

Changsok Yoo is a Professor in the Department of Culture, Tourism, and Content at Kyung Hee University. His research focuses on the game and entertainment industries, tourism, and consumer behavior in digital content, including how game monetization design shapes player trust and firm outcomes.

Dr. Lihua Quan is a lecturer in the Department of Culture, Tourism, and Content at Kyung Hee University. Her research interests include esports, player behavior, and business models in digital games. Her doctoral research examined how esports consumers choose among different viewing modes, while her recent work focuses on game monetization mechanisms and player decision-making.

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CONFLICTS OF INTEREST

The author(s) declare no conflicts of interest with the gambling or gaming industry.