

When Fun Becomes Exploitation: Player Perceptions of Deceptive Design Patterns in Games

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Deceptive design patterns, which attempt to deliberately influence user behaviour, are widespread in free-to-play games, and their problematic nature has prompted growing regulatory interest across the world. We report a mixed-methods study with over 100 UK adult players exploring whether loot-box use (LBU) and deceptive design pattern awareness (DPA) predict Internet Gaming Disorder (IGD), and how players recognise manipulative design. Qualitatively, reflexive thematic analysis uncovered a “Dark Pattern Paradox”: players clearly identify deliberate tactics (overt monetisation, temporal tricks, affective manipulation, and sensory/UI misdirection) that sustain engagement, obscure monetary value, and raise ethical concerns (notably for children), yet loot boxes often remain enjoyable. Quantitatively, LBU significantly predicted higher IGD in a model including LBU and DPA; however, DPA did not reduce addiction risk. Contributions include empirical evidence linking LBU to IGD, a player-centred taxonomy of game deceptive design patterns, and actionable design and policy interventions (e.g., monetary transparency, value-clarity in UI) to reduce harm and guide ethical game design. More broadly, our findings suggest that awareness and transparency alone may be insufficient consumer protections when monetisation systems are structurally designed to sustain engagement.

CCS Concepts: • **Human-centered computing** → Human computer interaction (HCI); Empirical studies in HCI; • **Applied computing** → Computers in other domains; Personal computers and PC applications; Computer games; Law, social and behavioral sciences; Psychology.

Additional Key Words and Phrases: Games, Deceptive Design Patterns, Loot boxes, Gaming Addiction, Ethical Game Design

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1 Introduction

Deceptive design patterns (also commonly referred to as dark patterns in prior research and industry discourse) are manipulative design strategies that steer users toward actions they might not otherwise take, typically in ways that prioritise developer goals (e.g., monetisation, retention, and engagement) over player autonomy or wellbeing [8, 28]. In digital games, particularly free-to-play mobile games as well as online PC and console games, these practices frequently appear as persuasive features embedded in gameplay, such as time-limited events, pay-to-win mechanics, or randomised loot systems. Unlike overt monetisation where costs and transactions are explicit (e.g., a clearly priced item in an in-game shop), deceptive design patterns often operate covertly, exploiting cognitive biases and habitual play to influence behaviour without the player's full awareness [34, 59]. Such designs not only shape moment-to-moment play but, over longer timeframes, have been associated with sustained harms including overspending issues, psychological distress, problem gaming and symptoms associated with gaming disorder [11, 18].

Games are fertile grounds for deceptive design patterns because they provide powerfully engaging forms of entertainment, often associated with fun, relaxation and social connection, while also embedding complex interactive economies and affective experiences that shape player behaviour. Immersion, flow, and narrative, which are qualities central to gaming's appeal, can both enhance engagement and obscure manipulation [4, 5]. Loot boxes have been the most prominent example to date of a deceptive design pattern in digital games. By tying chance-based rewards to progress and social status, loot boxes reproduce gambling-like reinforcement loops [27, 61]. Despite the attention to deceptive design patterns in general HCI contexts and their detection in 2D games or mobile apps [26, 39], little is known about how players perceive these manipulative strategies, particularly in 3D worlds where design affordances such as spatial placement or narrative pressure may mask deceptive mechanisms. Recent work suggests that immersive 3D contexts may introduce novel forms of deception [35], highlighting the need to understand not only which design strategies exist but also how players actually notice, interpret, or overlook them in context. In many contemporary games, gameplay generates the motivation to spend through scarcity, progression pressure, or social comparison while the transaction itself occurs in separate 2D store menus or overlays. Integrating these monetisation moments directly into 3D play environments collapses this separation, embedding purchasing within the same immersive context that drives engagement. Such integration may reduce critical scrutiny and make persuasive or monetised elements less salient, altering how players perceive and respond to deceptive design patterns.

Building on prior research, this paper investigates how players perceive manipulative design in 3D game contexts, and how these perceptions relate to loot box engagement and gaming disorder symptoms. Our research questions are: (1) To what extent do players notice and interpret deceptive design pattern elements within 3D gameplay context? (2) How do loot box engagement and deceptive design pattern awareness together predict gaming addiction? (3) What design and policy measures might mitigate harms, through better transparency or ethical interface design?

To answer these questions, we employ a mixed-methods approach and survey-based assessments of gaming behaviour and perceptions about deceptive design patterns in real-world 3D game scenarios that include representative manipulative mechanics. This allows us to capture how manipulative design is perceived and illuminate the cognitive and behavioural processes in context, moving beyond reliance on self-reported awareness alone. By integrating qualitative and quantitative findings, we show how deceptive design is perceived by players in context, and how these perceptions relate to broader risks, with implications for both ethical game design and consumer protection. This paper makes three contributions:

- A player-centred taxonomy of game deceptive design patterns: we derive a taxonomy grounded in reflexive thematic analysis of players' free-text responses as an empirically grounded vocabulary for researchers and designers to evaluate harms (e.g., financial harms, emotional strain, gaming addiction) in real games. This extends prior taxonomies by grounding classification in lived player experience in 3D gaming context.
- Integrated qualitative and quantitative evidence linking in-context detection to behavioural and wellbeing outcomes: by combining thematic analysis with statistical modelling, we show that recognising deceptive design patterns does not reliably reduce harmful engagement in gameplay, highlighting the limits of awareness-based interventions and the need for structural design safeguards.
- Actionable design guidance and evidence-informed policy considerations: from empirical patterns and participant rationale, we generate recommendations and regulatory guidance. This provides implementable heuristics for designers and evidence to inform consumer-protection policy and industry standards.

2 Related Work

2.1 Deceptive Design in Games

Deceptive design patterns, or dark patterns, are design strategies that intentionally exploit users' cognitive biases or decision heuristics to promote behaviours against their best interests [8, 28]. In gaming contexts, these practices include "grind" mechanics, forced waiting periods, manipulative notifications, or obfuscation of value through multiple in-game currencies [34, 59]. Unlike simple monetisation, deceptive design patterns thrive on asymmetries of information and attention, making it difficult for players to recognise when they are being steered [39]. A systematic literature review [45] argues that sensory persuasion (e.g., visual and auditory feedback) can obscure detection. Even tech-savvy users often sense manipulative intent but struggle to articulate or resist it [5]. While several studies adopt player-centred perspectives and document experiences of predatory or aggressive monetisation [1, 46], most focus on categorising mechanics or reported harms at a broad level. Foundational work by Zagal et al. [59] identified game-specific dark patterns including temporal pressure, grinding, and monetisation-linked friction, while more recent work by Gray et al. [29] proposed a broader unifying ontology of deceptive design patterns spanning digital environments. Bongard-Blanchy et al. [5] found that users often recognised manipulative intent while still complying with or feeling influenced by dark patterns to purchase goods and subscriptions. Relatedly, Deterding et al. [20] argued that applying "dark pattern" frameworks to games is conceptually complex because mechanics associated with manipulation may also overlap with pleasurable, meaningful, or socially valued aspects of gameplay, highlighting the need for empirical insights from players' actual evaluations. These perspectives suggest that awareness of manipulative design does not necessarily translate into disengagement or resistance, particularly in immersive gameplay environments where monetisation, progression, narrative engagement, and social reward systems are tightly intertwined.

Modern immersive 3D games intensify these concerns by combining rich spatial navigation, complex economies, and interactive narratives that engross players in compelling storylines and experiences [5, 14]. Gaming's massive scale and interactivity make this a pressing issue: for example, industry revenues are projected to reach \$733 billion by 2030 with the anticipated three billion players worldwide [52], and each player's in-game decisions often influenced by real-time data tracking and tailored experiences can amplify these effects [32]. This high degree of immersion and flow enhances engagement, but it also amplifies players' exposure to subtle manipulative design strategies, blending entertainment with covert persuasion. While potentially enjoyable, immersion

can reduce critical attention to interface features, making exploitative mechanics less likely to be noticed even by alert players [2, 4]. Recent work [35] identifies deceptive design strategies that are facilitated or amplified by spatial and narrative immersion (such as “physical placement” of costly items in the player’s spatial path, or “narrative obligation” where story elements create a sense of obligation to pressure purchases), suggesting that manipulative practices evolve alongside design affordances, underscoring the need for empirical work grounded in real gameplay scenarios. Building on this work, we extend this paradigm by integrating qualitative thematic analysis with behavioural (loot-box engagement) and gaming addiction measures to examine not only what players notice, but whether in-context detection relates to downstream risk. This allows us to connect perception with behavioural and wellbeing outcomes and to derive a player-centred taxonomy grounded in lived experience rather than detection accuracy alone.

2.2 Loot Boxes and Gaming Disorder

Loot boxes exemplify manipulative game monetisation. They are chance-based reward mechanisms purchasable with real or in-game currency, often combining variable-ratio reinforcement with progression and social signalling. A 2024 survey found that 84% of 13-15 year olds played online games [53], and concerns are increasing about young people’s exposure to gambling-like features such as loot boxes [18]. They impose financial burdens [49] yet often go unnoticed by adults due to lack of awareness [19]. Gacha systems function similarly, sometimes with “pity” guarantees, commonly tied to time-limited events that increase pressure to spend [15, 48]. Such mechanics exploit biases such as variable-ratio reinforcement, social proof, and loss aversion, and their resemblance to gambling has been widely documented [27, 51, 61]. Empirical studies consistently show associations between loot-box spending and problem gambling and gaming [13, 30, 38, 43], with evidence suggesting that loot boxes represent “a gateway” to problematic play behaviours for some groups [60]. These monetisation practices are often implicated in gaming disorder, defined in the 11th Revision of the International Classification of Diseases (ICD-11) as a pattern of digital- or video-gaming marked by impaired control, increasing priority of gaming over other activities, and continued or escalating play despite negative consequences [57].

Gaming disorder is associated with harms such as depression and reduced wellbeing [11, 16]. While excessive playtime has been implicated, recent work finds extrinsic, reward- and pressure-driven motives better explain wellbeing declines than hours played alone [55]. This shift highlights the importance of monetised and persuasive design features (e.g., loot boxes, streaks, NPC persuasion) in exacerbating vulnerability to addiction and harm. Research in psychology further indicates that awareness supports goal-driven control by aligning behaviour with personal values rather than stimulus-driven impulses [50], and higher emotional intelligence reduces risky decision-making by dampening impulsivity and reward reactivity [41]. These findings suggest that players vary in their susceptibility in games to manipulative game mechanics: those with lower deceptive design pattern awareness or greater sensitivity to extrinsic rewards may be more vulnerable to impulsive spending.

2.3 Regulation and Research Gap

Regulatory attention to deceptive design patterns in games is growing but remains inconsistent. The Federal Trade Commission’s (FTC) settlement with Epic Games over Fortnite marked a landmark recognition of “dark patterns” as harmful consumer practices, particularly for children [23], and in 2023, the Commission began issuing refunds totalling more than \$72 million to affected players as part of the \$245 million settlement [24]. Several EU member states have classified loot boxes as gambling [58]. Child-protection and consumer laws are also tightening, including the UK’s Age-Appropriate Design Code and new California’s consumer protection laws, increasingly targeting

monetisation practices and child protection [46]. Yet, enforcement in 3D spaces remains patchy, where manipulative design practices are harder to detect and govern. Calls are mounting for industry standards on monetary transparency and ethical interface design [34, 36].

Existing studies catalogue manipulative mechanics primarily in static app interfaces or 2D games [26, 39], focusing on detection in isolation of broader play contexts. In many games, the motivation to engage with monetisation emerges directly from core gameplay dynamics (e.g., progression goals, social competition), while the payment interaction often occurs through separate 2D overlays such as in-game stores. However, when monetisation interfaces are encountered within the very immersive context that creates the spending motivation, particularly in 3D environments including first-person, open world, or VR titles, the distinction between play and purchase collapses. This boundary collapse can shape attention, emotion, and narrative engagement in ways that support or obscure deceptive design cues. By treating these interfaces as embedded components of the play experience rather than as detached menus, we examine how deceptive design patterns operate in context, and how players detect and interpret them alongside narrative, spatial, and affective cues. Moreover, few studies have linked such perceptions to behavioural outcomes such as loot-box engagement or gaming-disorder symptoms. Bridging these gaps requires integrating player perspectives in context with quantitative risk measures to inform ethical design and policy.

3 Method

3.1 Participants

Two hundred and eight volunteers were recruited via convenience sampling to complete an anonymous online survey. Recruitment adverts were posted on social media and Bournemouth university's participants recruitment platform to broaden reach [44]. Inclusion criteria required participants to be aged 18+ years, resident in the UK, and to have played a commercial digital video game (on a mobile, PC, console, or VR platform) at least once within the previous 12 months. Records that were incomplete or that failed an engagement check were removed prior to analysis, following established practice for screening inattentive engagement [40]. Therefore, the final analytical samples for qualitative and quantitative analyses differed due to screening procedures for these incomplete responses across different components of the survey and inattentive engagement. After screening, the qualitative dataset comprised responses from 153 participants (mean age group 18-25, $SD=0.27$; Gender: Female=111, Male=33, Non-binary=3, Other=6; Ethnicity: White=138, Black=1, Asian=7, Mixed/Multiple =6, Other=1). The quantitative dataset comprised 129 participants (mean age group 18-25, $SD=0.29$; Gender: Female=89, Male=32, Non-binary=3, Other=5; Ethnicity: White=116, Black=1, Asian=6, Mixed/Multiple=5, Other=1).

3.2 Design and Procedure

This study used a within-subjects, mixed-methods survey design combining forced-choice detection items, open-ended reflections, and optional psychometric measures. After informed consent and collection of demographics, participants read a brief definition of "dark design" intended to standardise understanding using accessible participant-facing language to minimise technical jargon and support comprehension for non-specialist participants ("Dark Design is where the creators of the game are trying to influence what the player does, to try to make money from the players through their actions."), though the paper adopts the term deceptive design patterns in line with current HCI literature. Each participant then viewed four short gameplay clips (Clips A-D; see 3.3 Materials and Measures). Using video clips in online surveys has been shown to be a successful technique for investigating user perceptions of designer intent and deceptive design patterns in 3D gameplay contexts [35] and mobile applications [26], supporting valid interpretation

and engagement across participants. For each clip participants indicated whether they believed any deceptive design pattern was present (yes/no); affirmative responses opened an optional open-text prompt asking respondents to describe what they had noticed, designer intent, and why they judged the clip to contain deceptive design patterns. After participants watched all the clips and answered the questions, brief definitions of loot boxes, gacha, and interpersonal persuasion used in the clips were disclosed to participants. They were then asked to reflect on their awareness of, and reactions to, deceptive design patterns in their own gameplay experiences, and how their experiences and behaviour have or have not been affected. Finally, they completed the quantitative measures including Risky Loot-box Index (RLI; if they have encountered loot boxes in games) and the Internet Gaming Disorder Scale 9-Short Form (IGDS9-SF). The full session took approximately 30 minutes. The survey was hosted on Qualtrics and was accessible via link or QR code. Ethical approval was obtained from Bournemouth University's research ethics committee. Participants provided informed consent and were informed they could withdraw at any time without a reason or consequence. Debriefing materials included researcher contact details and links to support resources. Anonymous quantitative data and de-identified qualitative excerpts are available and can be provided in line with ethics upon request.

3.3 Materials and Measures

Four short gameplay video clips (Figure 1) were used as standardised visual stimuli to elicit detection and reflection on deceptive design patterns in context. All clips were captured directly from live gameplay and lightly edited for clarity and consistency (e.g., trimming, zooming) so that key interface elements and dialogue were legible when embedded in online surveys. Clips were approximately 1-1.5 minutes long and included brief gameplay context leading into the focal interaction. Clips were presented from Clip A to Clip D for consistency, and each clip was followed by a forced-choice detection item (yes/no: "Is dark design present?") and, when answered "yes," an open-ended prompt asking participants to describe the features and rationale for their judgement. The clips were not intended to introduce new categories of deceptive design patterns but to serve as controlled probes of recognition and interpretation. Our aim was to examine whether and how players detect and reason about these design mechanics in context. A neutral control clip was included to assess false positives. Because the study focuses on how players interpret deceptive design patterns in context rather than on signal-detection accuracy, we prioritised coverage of distinct deceptive design categories over a balanced number of neutral and deceptive clips. The neutral clips therefore served primarily as a contextual comparison condition in this study, and future work focused on detection accuracy could incorporate additional neutral clips and more balanced design.

We sampled clips from commercially available free-to-play platforms to cover a range of distinct monetisation paradigms and design strategies identified in prior taxonomies [28, 35, 59], including value obfuscation and monetisation-linked friction (Clip A: loot boxes and currency conversion), affective/interpersonal persuasion (Clip B), neutral interaction as contextual comparison (Clip C), and temporal pressure and variable reward reinforcement (Clip D: daily rewards and gacha systems). They were reviewed by three experts to ensure the presence (or absence) of deceptive design elements. Specifically, they include:

- Clip A – Roblox Jailbreak (loot boxes). The clip shows purchasable loot boxes with odds display for obtaining more limited items (e.g., "5% ultra rare"), and it also demonstrates in-game currency conversion (from Robux to game cash). It illustrates monetised rivalry and currency-confusion affordances (loot-box mechanics, odds display, celebratory feedback) to examine recognition of monetary extraction and sensory persuasion.

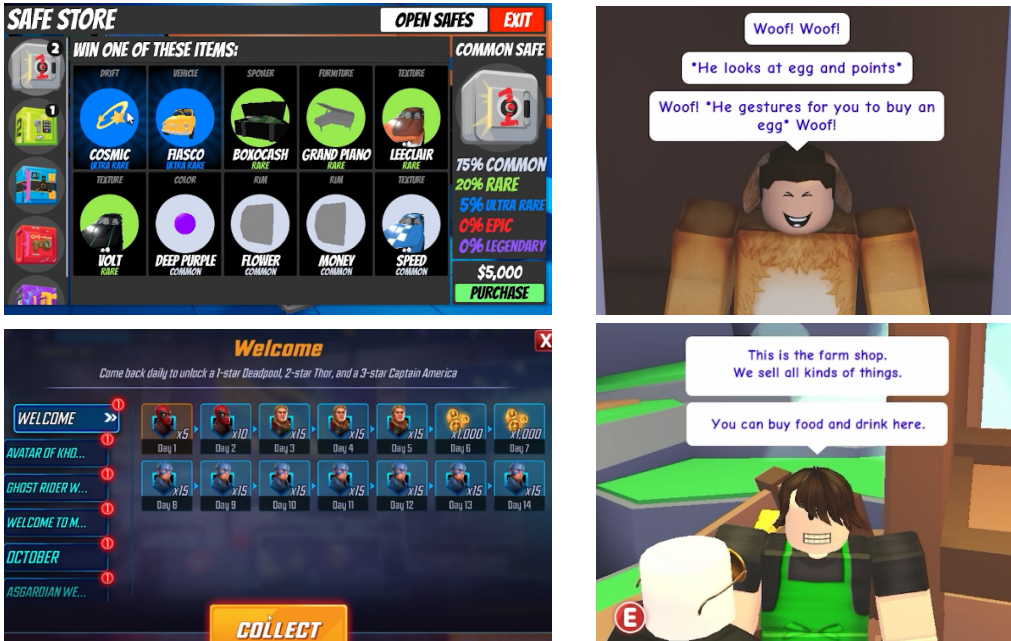


Fig. 1. The screenshots¹ of the four clips: Clip A (top left): *Roblox Jailbreak* ©Badimo; Clip B (top right) and Clip C (bottom right): *Roblox Adopt Me* © Uplift Games; Clip D (bottom left): *Marvel Strike Force* © Scopely, Inc.

- Clip B – Roblox Adopt Me “Doug” (persuasion). This depicts affective and interpersonal persuasion via a comical half-man/half-dog NPC using compliance-gaining language (e.g., “He looks sad as if he’ll be upset if you don’t buy an egg”). The clip was intended to probe perceptions of emotionally persuasive design cues rather than direct monetary extraction alone.
- Clip C – Roblox Adopt Me “Justin” (neutral NPC). This clip acts as a control showing an interaction matched to Clip B with “Justine”, a plain-looking NPC delivering factual information only with a neutral facial expression and no compliance-gaining attempts.
- Clip D – Marvel Strike Force (gacha and play-by appointment). The clip shows a Marvel mobile game sequence demonstrating a daily reward system (play-by-appointment) and randomised reward mechanics (gacha) to probe recognition of time pressure and gambling-like reward schedules.

Standard sociodemographic items included age group, gender (optional), and ethnicity. For each clip participants answered whether they believed dark design was present (yes/no). To operationalise deceptive design pattern awareness (DPA), binary (yes/no) detections of deceptive design patterns were summed to create a DPA score (range 0-4) to measure recognition breadth across the four stimulus clips, following prior survey approaches to awareness of dark patterns [26] and capturing cross-context recognition rather than intensity of concern. If participants responded “yes”, they could elaborate in an open-ended text box on the reasons regarding specific deceptive design patterns noticed, and what they think the designer was trying to get the player to

¹Screenshots captured by the authors under ACM’sFairUse (Section 107) only for the purpose of critique.

do. Following all the clips, they elaborated on their own gameplay experiences and reflected on how deceptive design patterns have (or have not) affected their behaviour and experiences (see Supplementary Materials); these free-text responses form the qualitative corpus (see Qualitative Analysis).

Loot-box use (LBU) was assessed via the Risky Loot-Box Index (RLI; [10]). The RLI comprises five items on a 5-point Likert scale (score range 5-25) and is a validated scale [31] intended to capture risky behavioural engagement with loot-box mechanics. Gaming addiction was measured with the Internet Gaming Disorder Scale 9 - Short Form (IGDS9-SF; [47]), a nine-item, five-point scale (score range 9-45) assessing gaming behaviour over the prior 12 months. It has strong psychometric support and is widely used across gaming-disorder research contexts [33].

3.4 Data Analysis

Following screening, records with incomplete responses or failing the inattentive-engagement check were removed, resulting in two analytic datasets. Below we describe the reflexive thematic analysis applied to the qualitative portion and the statistical procedure used for the quantitative analyses.

3.4.1 Qualitative Analysis. Open-ended responses from 153 participants (see demographics in Participants above) who indicated deceptive design pattern presence were analysed using reflexive thematic analysis (RTA; [6, 7]). The analytic process was iterative and reflexive: three authors independently conducted initial coding on the entire qualitative corpus ($n=153$), generated candidate themes through recursive engagement with the data, and refined themes through triangulation and discussion with co-authors. Analysis steps included familiarisation, inductive coding, theme development, and iterative review against the dataset. We did not compute inter-rater reliability because our approach is reflexive and interpretative; instead, coding decisions were documented, and disagreements were resolved through discussion. To support transparency and transferability, illustrative participant quotes are embedded in the Results with participant IDs. The analysis explicitly foregrounds players' sense-making and evaluative language (how participants talk about design), rather than imposing a priori taxonomies; however, results are also mapped onto HCI-relevant constructs (e.g., affordances, feedback, habit architectures) to support design implications.

3.4.2 Quantitative Analysis. Quantitative analyses of 129 participants' responses (see demographics in Participants above) were conducted in SPSS (Version 29.0.1.0). Descriptive statistics were computed for DPA, RLI, and IGDS9-SF. The inferential test was a multiple linear regression predicting IGDS9-SF total scores from two simultaneously entered predictors: RLI and DPA. Predictor selection was theory-driven: prior literature links loot-box engagement with problematic gaming and suggests awareness as a potential protective factor (see Related Work). The regression model was designed to complement the qualitative findings by testing whether in-context detection (DPA) functioned as a protective factor against gaming-disorder symptoms, as suggested by participants' reflections on awareness and self-regulation. Model assumptions (independence of residuals, normality, linearity, homoscedasticity, multicollinearity, and influential cases) were assessed.

3.5 Positionality

The authors approach this work as interdisciplinary researchers with backgrounds spanning human-computer interaction, psychology, computer science, and game studies. Our disciplinary backgrounds and prior work on design ethics shape our attention to both the cognitive mechanisms underpinning player behaviour and the design choices that structure gameplay experiences. We emphasise transparency about these perspectives to situate the analysis and have attempted to mitigate bias through reflexivity, coder triangulation, and collaborative review of candidate

themes. At the time of study conduct, none of the authors had personal or professional conflicts of interest with the games or clips used, and participants were recruited anonymously with no known relationship to the research team.

4 Qualitative Results

We analysed open-ended responses from 153 UK-based adult players using reflexive thematic analysis as described previously. Four themes emerged from our analysis (Table 1): Manipulative Design Strategies, Player Responses and Ethical Concerns, Ambivalent Experiences of Loot Boxes, and Sustained Engagement and Investment. Each theme is composed of the subthemes below. Quoted material included below is taken verbatim from anonymised participant responses and is indicated by participant ID (e.g., P-47).

4.1 Manipulative Design Strategies

Participants consistently identified a set of deliberate design techniques that function to extract money or attention. These techniques were talked about as intentional features of games rather than accidental by-products of design. Across accounts, four subthemes emerged: overt greed and predatory monetisation, temporal tricks, affective manipulation, and UI and sensory misdirection.

4.1.1 Overt Greed and Predatory Monetisation. Many participants framed monetisation as an overt commercial choice that undermines fairness and play. Participants used evaluative language such as “greedy” and “deceitful” to characterise systems that gate meaningful progression, advantages or status behind paywalls. For example, P-149 explained that aggressive monetisation “*ruins the experience for me as it makes it feel like if I don’t buy what they’re offering, I’ll have worse gameplay*,” and P-45 labelled frequent aggressive mechanics as making designers appear “greedy.” Participants repeatedly criticised pay-to-win dynamics where “the best items, boosts or packs” require additional spending or are unattainable without payment, turning play from a skill or collaboration activity into a spending contest. Several participants explicitly invoked the language of fairness and competition, for example, P-92 noted “*the game becomes not a game of skills and collaboration, but whoever spends more money to obtain rewards*”. Overall, participants interpreted predatory monetisation as a design strategy that prioritises spending over skill and fair progression.

4.1.2 Temporal Tricks. Time-based mechanics were frequently described as coercive levers that extend play or escalate pressure to spend. Participants reported clear experiences of being “caught” by temporal designs: P-135 conceded they had “*definitely fallen for the tricks like streak rewards and played on a game way longer than I wanted to*.” Grinding mechanics – repetitive, low-reward play required to progress – were often experienced as tedious and criticised for pushing players toward paid shortcuts, which “*ruin the gameplay experience by making playing the game less rewarding and forcing grind design for those that can’t pay/don’t want to pay*” (P-35).

Play-by-appointment systems (timed login rewards) and limited-time events were also associated with anxiety and compulsion. These mechanics create pressure to avoid missing rewards or progression opportunities which some participants described as generating pressure rather than enjoyment to “*make the player feel they must play every day*” (P-43). Several participants also described how temporal pressure interacts with monetisation when players pay to avoid grind or to catch up in time-limited offers.

Overall, temporal tricks operate by converting time into an implicit cost (progress lost, status diminished) and thereby create both motivational and transactional pressure. Participants’ accounts show how temporal design can function as an upstream lever that increases the effectiveness of downstream monetisation.

Table 1. Theme table from analysis of responses across all four video clips

Theme	Subtheme	Description	Example Quote
Manipulative Design Strategies	Overt Greed and Predatory Monetisation	Explicit monetisation that gates progress or gives pay-to-win advantages; experienced as blatant revenue-seeking that undermines fairness.	“In order to gain more profit from the player...ruins the experience for me as it makes it feel like if I don’t buy... I’ll have worse gameplay.” (P-149)
	Temporal Tricks	Time-based mechanics (play-by-appointment, login streaks) that pressure continued play or buying to avoid missing progress.	“I have definitely fallen for the tricks like streak rewards and played on a game way longer than I wanted to.” (P-135)
	Affective Manipulation	Narrative/social cues (NPCs, guilt prompts) that leverage emotion to encourage purchases.	“The NPC influencing you to buy an egg and being sad if you don’t” (P-123)
	UI and Sensory Misdirection	Visual/auditory feedback, dynamic buttons, celebratory effects that reframe purchases as rewards and misdirect attention.	“The buy button changed colour so the players attention is drawn to it” (P-55)
Player Responses and Ethical Concerns	Deceptive Design Pattern	Emotional reaction: annoyance, frustration, reduced enjoyment when monetisation intrudes on play.	“Very put off by games that do this -seems deceitful.” (P-148)
	Dissatisfaction	Distinction between intrusive vs. unobtrusive monetisation.	
	Moral Discomfort for Vulnerable Players	Ethical worry about impacts on children and vulnerable players; design seen as exploitative beyond individual annoyance.	“Many robux players are children, so they would be attracted by the bright colours and animals and buy more.” (P-138)
Ambivalent Experiences of Loot Boxes	Artificial Scarcity	Rarity or limited-time mechanics create status and compel play despite awareness of manipulation.	“If there is a character I particularly want... I will play obsessively to farm... if I don’t get them I worry I will be disappointed.” (P-114)
	Risk and Reward	Loot boxes evoke thrill and surprise but are also compared to gambling; same participants often report both attitudes.	“Creates a similar sense to if you were gambling or playing a lottery. The hopes of getting the best possible item that enhances your experience.” (P-105)

Sustained Engagement and Investment	Habit Loops and Streaks	Daily rewards and login streaks create habitual return and perceived obligation to maintain progress.	“The streaks keep me coming back to the game even if I am bored of it.” (P-138)
	Sunken-Cost Fallacy and Transactional Harm	Players continue playing or spending to justify past investments, sustaining engagement even when dissatisfied.	“I have played more even if I started to get bored of the game because I would feel like I’ve wasted money.” (P-15)
	Obfuscation of Value	Multiple currencies, conversions, and UI masks make real cost unclear, encouraging impulsive spending.	“Having real money converted into in game currency gives illusion that you didn’t spend your own real money” (P-49)

4.1.3 Affective Manipulation. Participants highlighted the use of interpersonal and narrative cues that deliberately invoked emotion to prompt spending. The NPC in Clip B was repeatedly cited as a paradigmatic example: “*He will be sad if you don’t buy an egg.*” (P-72). Participants described the emotional leverage as an explicit design tactic to induce guilt, and they frequently named guilt as the primary affective response: P-4 observed that the prompt “*makes the player feel guilty and to appease their guilt they buy an egg.*”

Some participants emphasised the ethical salience of this tactic when it targets or could affect children: “*Using the dog in a game designed at children will peak their interest*” (P-129), and the design “*Emotionally manipulate[s] children to buy robucks [robux].*” (P-74). Several participants also noted more subtle uses of interpersonal persuasion leveraging social cues to make players want to “*talk to someone*” or “*further social interactions*” though these were mentioned less often than guilt-based prompts.

Overall, affective manipulation blurs the boundary between narrative engagement and commercial persuasion. Players perceive these cues as engineered emotional leverage rather than incidental storytelling, raising distinct ethical concerns because they exploit empathetic or social processes that are central to narrative play.

4.1.4 UI and Sensory Misdirection. Participants described numerous sensory and interface tactics that frame spending as a hedonic outcome and mask transactional friction. Commonly cited examples included dynamic purchase buttons that “*changed colour so the player’s attention is drawn to it*” (P-55), celebratory effects (confetti/fireworks) following a purchase (P-21), and unclear cancellation affordances (“*the cancel button isn’t visually distinct,*” P-35). Such elements were characterised as encouraging impulsive actions, making players “*feel like they were missing out when not spending money*” (P-34).

Participants also highlighted interface flows and affordances that facilitate accidental or repeated spending (e.g., quick re-purchase flows, immediate prompts to buy currency when currency is insufficient). One participant described how the game “*automatically brings up the necessary tabs to purchase the currency the player was missing*” (P-91), while another noted UI designs that redirect players to purchase screens without clear confirmation, thereby increasing the chance of repeated or unintended transactions (P-99).

Overall, sensory feedback and micro-affordances are central mechanisms by which purchases are made to feel rewarding and frictionless. Players’ attention to visual salience, feedback loops, and

confirmation affordances points to concrete HCI levers that mediate the psychological experience of spending.

4.2 Player Responses and Ethical Concerns

Players' accounts of manipulative design were not purely descriptive: they also conveyed affective reactions and moral judgements. Two interrelated subthemes emerged across the data: Deceptive Design Pattern Dissatisfaction, where players described irritation, frustration, and degraded enjoyment when monetisation intruded on play; and Moral Discomfort for Vulnerable Players, where participants expressed ethical concern about the effects of these designs on children and other vulnerable users.

4.2.1 Deceptive Design Pattern Dissatisfaction. Many participants framed their encounters with deceptive design patterns in terms of negative affect and reduced enjoyment. They expressed annoyance and disengagement when monetisation felt excessive. For example, P-148 said bluntly that they were *“very put off by games that do this – seems deceitful,”* and P-66 said that deceptive design patterns *“affect the experience”* and *“dissuade me from playing”*. Similarly, P-11 said, *“they make me less likely to want to play the game due to the negative experience.”* Participants articulated multiple dimensions to this dissatisfaction. Some emphasised the frequency and obviousness of tactics: excessive or repetitive prompts that interrupted flow were particularly resented. Others focused on instrumental effects: when monetisation changes the balance of competition or progression (i.e., pay-to-win), enjoyment was described as eroded because skill and collaboration were displaced by spending. P-107 captured this orientation about disengagement: *“Personally, I feel discouraged in playing these types of games with the use of dark patterns as I personally do not want to spend money on video games.”*

Yet, responses were not uniformly negative. Notably, discrete, limited, or non-intrusive monetisation was sometimes judged acceptable. As P-66 put it, though noting the negative experience simultaneously, *“if it is an understandable amount that doesn't affect gameplay it is okay,”* and P-4 noted deceptive design patterns not really affecting their play experience due to their capability to *“ignore any attempts to get me to purchase in game items,”* suggesting that perceived intrusiveness and the extent to which spending dominates core mechanics are key factors shaping player dissatisfaction.

Overall, dissatisfaction is a nuanced reaction shaped by perceived intrusiveness, prevalence, and impact on fairness and experience. Though many players expressed negative experience and attitudes to deceptive design patterns, a minority of comments indicate some practices being tolerable and that not all commercial design is equally problematic from a player-centred perspective.

4.2.2 Moral Discomfort for Vulnerable Players. Beyond personal annoyance, many participants voiced ethical concerns that extended beyond their own experiences to potential harms for children and vulnerable players. Moral language such as *“exploitative,” “targeting children,” “emotional blackmail”* recurs in responses that link design choices to societal risk. For instance, P-138 also warned that *“many robux players are children, so they would be attracted by the bright colours and animals and buy more.”* and P-38 described the NPC guilt prompt as a mechanism that is *“tailored to younger audiences, who can very easily be influenced by the thought of letting someone down even if it's just an NPC.”* These concerns combined affective and visual/sensory critique, producing moral disquiet that extended beyond personal annoyance to worries about societal impact.

Concern was not limited to financial harm as participants emphasised emotional manipulation and the exploitation of trust or affection. P-13 characterised the tactic as *“emotional blackmail from the shopkeeper who's selling gambling eggs,”* that *“especially targets children (who don't really understand/ care about probability)”*, explicitly framing the design as morally questionable. Several

respondents also drew attention to the cumulative effects of such designs on social norms and expectations around gaming, suggesting that pervasive manipulative strategies normalise extraction and shift industry incentives away from entertainment and toward revenue maximisation.

Overall, moral discomfort centres on perceived exploitation of vulnerable players, especially minors, and on the normative framing of design as a purposeful revenue strategy. These accounts not only document individual unease but also constitute a collective ethical evaluation that situates deceptive design patterns within broader social harms.

4.3 Ambivalent Experiences of Loot Boxes

Loot boxes emerged as a focal site of contradiction in participants' accounts. The ambivalent experiences of loot boxes embodied a consistent paradox of our qualitative data: while many players included loot boxes when naming monetisation practices they resented, sometimes the same participants also described loot boxes as enjoyable, exciting, or integral to the game's appeal. This ambivalence surfaces two tightly linked subthemes: Artificial Scarcity, which creates status and compulsion, and Risk and Reward, which is the thrill or "surprise" dynamic that participants likened to gambling. Both subthemes show how hedonic affordances can coexist with critical awareness, complicating simple models where recognition of manipulation predicts avoidance.

4.3.1 Artificial Scarcity. Participants described scarcity mechanics (rarity tiers, limited-time characters/items) as powerful drivers of engagement and social signalling. As P-99 noted, by "putting the high value 'rare' items at the top and hiding the common items below" designers make it "seem as if the loot box is worth buying". Receiving a high-value or rare item was often framed as a source of joy and renewed investment, and this made P-110 "more invested in playing the game". Scarcity triggered behavioural responses beyond immediate pleasure: people reported saving or farming in-game currency repeatedly, or spending real money to chase time-limited items. P-114 captured this compulsion:

"I do find that if there is a character I particularly want to get then I will play obsessively to farm in game currency so I can get them. If I don't get them I worry I will be disappointed so sometimes I spend money if I'm running out of time on a limited character."

Social dynamics reinforced scarcity's pull: rare items conferred status, and lacking such items produced feelings of inferiority (P-39: feeling "*lower than other players*"). Participants therefore experienced scarcity both as a pleasurable rarity economy and as a pressure to act, often in ways that conflicted with their critical view of monetisation.

Overall, artificial scarcity couples social signalling with temporal pressure; it creates a utility for items that is partly instrumental, partly hedonic, and partly social. This hybrid value makes scarcity resistant to interventions that rely only on increasing awareness of manipulative intent.

4.3.2 Risk and Reward. Many participants emphasised the "mystery" and excitement of opening loot boxes: "*The element of surprise*," said P-62, and P-88 called out the "*excitement and thrill of opening them*." These affective responses were explicitly compared to gambling by some participants: P-105 observed a "*similar sense to if you were gambling or playing a lottery*." Crucially, several participants voiced both perspectives – enjoying the mechanic's surprise while simultaneously recognising its exploitative similarity to gambling. For instance, P-125 noted that deceptive design patterns "*can make you feel like you are missing out*," yet later said of loot boxes, "*They can be beneficial to the game play and it can be exciting to get something you want*." Other blunt reflections such as "*I LOVE THEM, on certain games i.e. COD [Call of Duty]*" (P-120) and "*They are fun so they steal my money*" (P-13), illustrate the psychological tug-of-war between pleasure and regret.

Therefore, the risk-reward loop sustains repeated engagement because it taps into reward anticipation and intermittent reinforcement. The same reinforcement schedule that creates excitement also increases susceptibility to overspend, and because players often value the hedonic aspect, interventions that merely label or explain the manipulation may have limited behavioural impact, which indicates a complex target for HCI design and policy responses.

4.4 Sustained Engagement and Investment

Beyond single mechanics or moments of persuasion, participants described a set of features and psychological dynamics that operate over time to sustain play and rationalise continued spending. These accounts foreground three interlinked subthemes: Habit Loops and Streaks that normalise return; Sunk-Cost Dynamics and Transactional Harm that bind players to games despite dissatisfaction; and Obfuscation of Value through currency systems and UI flows that mask real cost.

4.4.1 Habit Loops and Streaks. Daily rewards, login streaks, and milestone systems were repeatedly characterised as habit-forming architectures that convert occasional play into regular routine. Many participants noted the daily streaks, and several mentioned feeling compelled and pressured to log in and engage primarily to avoid losing progress or benefits: *“they want the player to open the game every day and pressure them into holding up their streak.”* (P-138). Others highlighted the temporal scale of these systems (daily, weekly, monthly) which normalise continuous return: *“monthly daily logins to incentivise players to login for multiple months”* (P-60). Free loot-box rewards or low-friction gifts tied to streaks were noted as an onboarding pathway to gambling-like behaviours (*“free lootbox rewards to introduce the player to the gambling mechanic,”* P-43). Participants also described how reward collection often funnels players back into the shop: *“tried to send the person straight to the store after opening the prize”* (P-42), linking habit maintenance to monetisation opportunities.

Overall, habit architectures operate by lowering the activation energy for return and by embedding small, repeatable incentives into players’ routines. These systems therefore function as infrastructure for longer-term engagement rather than isolated nudges.

4.4.2 Sunken-Cost Fallacy and Transactional Harm. Monetary and temporal investments were described as creating a psychological momentum that makes stopping difficult. Multiple participants reported continuing play or further spending to justify previous investments: *“make me spend more and then play more to justify it”* (P-53). For some, this dynamic persisted even when the game was no longer enjoyable: *“I have played more even if I started to get bored of the game because I would feel like I’ve wasted money”* (P-15). Relatedly, some participants framed harm in transactional terms – they would only consider withdrawing after reaching a threshold of financial over-extension, suggesting a negotiated tolerance for incremental losses: *“I don’t buy what I can’t so I wouldn’t say it affects me too much”* (P-45); *“generally they are easy not to fall into if your broke”* (P-13).

Overall, sunk-cost rationales show how past commitments function as a psychological retention mechanism that sustains both play and spending. This creates a form of transactional harm that may accumulate gradually and be rationalised by players themselves despite awareness until it becomes substantial.

4.4.3 Obfuscation of Value. Participants frequently identified currency systems, conversions, and interface flows that obscure the real cost of transactions, making spending feel less immediate and more dissociated from real money. P-49 captured a common sentiment: *“Real money converted into in-game currency gives illusion that you didn’t spend your own real money.”* Participants also described how multiple currencies, bundles, and conversion systems complicated value judgements and reduced spending transparency. As P-43 noted, *“the multiple in-game currencies that require*

conversion... are predatory to me". One participant summarised this multi-layered obfuscation in gambling terms: "*Gacha games are inherently dark designs as they are gambling and you have to spend more than the item's worth to receive it... it is difficult to tell how much money the item is actually worth*" (P-128). Several respondents further highlighted how streamlined purchase flows reduced friction around spending and encouraged impulsive transactions. Overall, participants interpreted these systems as reducing transparency and weakening players' ability to accurately evaluate spending decisions.

5 Quantitative Results

5.1 Descriptive Statistics

Across the quantitative sample (N=129), mean scores indicated variability across the three focal measures: gaming addiction (IGDS9-SF) $M = 19.50$ ($SD=6.52$, $Min=9$, $Max=39$), deceptive design pattern awareness (DPA; summed detection index, 0-4) $M = 2.95$ ($SD=0.73$, $Min=1$, $Max=4$), and risky loot-box use (RLI) $M = 14.69$ ($SD=5.22$, $Min=5$, $Max=25$). The DPA mean corresponds to participants, on average, recognising dark design in roughly three of the four stimulus clips. Examining detection by clip (correct identification of presence/absence of dark design) shows that Clip A (Roblox: Jailbreak, demonstrating loot box) had the highest correct detection count ($n=119$), followed closely by Clip B (Roblox: "Doug", demonstrating interpersonal persuasion; $n=117$). Correct detection was lower for Clip C (Roblox: neutral NPC as control; $n=82$) and lowest for Clip D (Marvel Strike Force, demonstrating gacha/play-by-appointment; $n=63$). These per-clip patterns suggest that overt monetisation and affective manipulation were more salient to participants than the temporal/gacha mechanics presented in Clip D, while the control clip yielded a substantial number of incorrect/ambiguous judgements, indicating some uncertainty around what constitutes a deceptive design pattern in otherwise neutral interactions.

5.2 Inferential Statistics

A multiple linear regression was conducted to examine variance in gaming addiction (IGDS9-SF) from two simultaneous predictors ($n = 129$): deceptive design pattern awareness (DPA) and loot-box use (RLI). Prior to hypothesis testing we checked model assumptions. Residuals were independent (Durbin-Watson = 1.92), approximately normally distributed (histogram and normal P-P plot of standardised residuals), and linearity was supported by partial regression plots. A plot of studentised residuals versus predicted values indicated homoscedasticity. There was no multicollinearity (DPA: Tolerance = 1.00, VIF = 1.00; RLI: Tolerance = 1.00, VIF = 1.00) and no influential outliers (standardised residuals ranged from -2.34 to 2.48). Predictor variances were non-zero (DPA variance = 0.53; RLI variance = 27.22).

The regression model (Table 2) was significant ($F(2,126) = 9.08$, $p < .001$), explaining 12.6% of variance in IGDS9-SF scores ($R^2 = .126$; adjusted $R^2 = .112$). According to conventional benchmarks this represents a small effect size (Cohen, 1988). Examining individual predictors, RLI was a significant positive predictor of gaming addiction (standardised $\beta = 0.35$, $t = 4.25$, $p < .001$; unstandardised $B = 0.44$), whereas DPA was not a significant predictor (standardised $\beta = 0.02$, $t = 0.28$, $p = .78$; unstandardised $B = 0.21$).

6 Discussion

This study integrated contextualised, clip-based detection tasks with qualitative reflection and standardised psychometrics to examine how players notice, interpret, and respond to manipulative game design. Methodologically, our work builds on clip-based detection paradigms [26, 35] but advances them by coupling perception measures with validated behavioural and wellbeing scales,

Table 2. The unstandardised coefficient (B), standardised coefficient (β), standard error (SE), t-statistics, and p-values

Model	B	SE	β	t	p
(Constant)	12.4	2.72		4.57	<.001
DPA	0.21	0.75	.023	0.28	0.78
RLI	0.44	0.10	0.35	4.25	<.001

enabling analysis of whether awareness translates into protection. Two main empirical snapshots emerge. First, players are broadly aware of many manipulative strategies (currency confusion, aggressive monetisation, affective NPC persuasion, UI misdirection), but awareness does not uniformly translate into behavioural protection. Second, loot-box use (LBU) was a significant positive predictor of gaming addiction symptoms (i.e., Internet Gaming Disorder; IGD) in our regression model ($\beta = .35$, $p < .001$), while deceptive design pattern awareness (DPA) was not significantly associated with lower IGD symptoms. Although the regression model explained a modest proportion of variance ($R^2 = .126$), the findings align with prior literature linking loot-box engagement to problematic gaming and gambling-related harms [10, 38, 60]. Importantly, the regression findings should be interpreted as evidence of association rather than causation, given the self-report and cross-sectional nature of the data. Together, these results produce an empirically grounded, player-centred taxonomy of game deceptive design patterns and point to structural, not merely individual, levers for ethical intervention.

6.1 Awareness Without Protection

The qualitative and quantitative findings are mutually informative. The thematic analysis revealed that many players could articulate manipulative mechanics yet still described continued engagement due to enjoyment, habit, or social incentives. The regression results mirror this pattern behaviourally: detection breadth (DPA) did not predict lower IGD symptoms, whereas loot-box engagement did significantly predict higher IGD symptoms. This suggests that monetised reward engagement may function as a behavioural risk factor for problematic play. By contrast, recognising manipulative mechanics does not necessarily translate into reduced vulnerability. Thus, awareness alone appears insufficient protection against gaming addiction, and structural reinforcement mechanisms may outweigh individual knowledge or reflective judgement. This finding has broader implications for HCI and digital consumer protection research because current interventions may implicitly assume that informed users can effectively resist manipulative systems. Our results challenge this assumption by showing that players can simultaneously recognise deceptive practices and continue engaging with them when social, hedonic, and structural reinforcement mechanisms are intertwined. Consequently, consumer awareness initiatives may be necessary but insufficient unless accompanied by systemic design constraints and accountability measures.

6.2 The “Dark Pattern Paradox” of Loot Boxes

Participants were strongly concerned about the use of multiple currencies and loot-box mechanisms (Clip A), echoing prior research [35] and EU consumer reports [21] that describe intermediate currency as a driver of unconscious overspending. Our findings extend this by highlighting how currency confusion and value opacity compounds harm when coupled with randomised mechanics (e.g., Clip A and Clip D). Interestingly, our participants’ ambivalent experiences of loot boxes indicated a “dark pattern paradox”, a gameplay-specific manifestation of the broader

tension documented in deceptive design research: the same players who recognised loot boxes as manipulative often described them as enjoyable and status-generating. This extends prior HCI work showing that awareness does not necessarily grant users resistance in broader deceptive digital systems, such as web interfaces and general online choice architectures [5], into immersive gameplay environments. In our study, on one hand, Clip A (loot boxes with in-game currency conversion) was the most frequently identified as containing deceptive design patterns, and quantitative evidence supports the concern regarding loot boxes: LBU significantly predicted IGD, aligning with prior research highlighting loot-boxes as a structural risk factor for problematic play and gambling-like harm [10, 60]. On the other hand, participants also described loot boxes as exciting, socially rewarding, and enjoyable. Artificial scarcity and social signalling make rare items valuable (P-114), while intermittent reinforcement (surprise) produces thrill akin to gambling that enhances play experiences (P-105). Importantly, our findings therefore do not suggest that all forms of surprise, collection, progression, or rarity should be removed from games altogether. Rather, the concern is with implementations that rely on excessive pressure, obscured costs, exploitative reinforcement schedules, or habitual spending. In behavioural terms, loot boxes combine social, hedonic, and uncertainty-based rewards; in our quantitative model, higher LBU was associated with higher IGD, consistent with this reinforcement account. Crucially, the paradox also explains why detection (DPA) did not predict lower IGD: hedonic value and social incentives can outweigh critical awareness.

6.3 Affective Manipulation and Normalised Deception

Interpersonal persuasion (Clip B) was particularly salient: the anthropomorphic “Doug” NPC provoked strong reactions, with players recognising emotional manipulation strategies such as guilt induction (“self-feeling”) and “liking” [42]. Persuasive NPCs were interpreted as exploiting social heuristics, suggesting that anthropomorphic cues amplify the persuasive potential of deceptive design patterns in 3D and mobile contexts [35]. By contrast, participants’ fewer attributions of manipulative design to the control clip (Clip C), though indicating some uncertainty around deceptive design patterns, demonstrate that players can generally distinguish between neutral and deceptive NPC interactions. This suggests that emotional manipulation and authority cues, not NPC interactions per se, are what trigger perceptions of deception.

Amongst all clips, Clip D (daily rewards and gacha) was the least frequently identified as containing deceptive design patterns, despite both practices being widely recognised as predatory [15, 46]. This under-identification suggests that normalisation of such mechanics may have masked their manipulative qualities, particularly when rewards are framed as routine or “free”. In addition, our findings reinforce the salience of physical and visual placement as a deceptive design pattern in 3D environments. Similar to Physical Placement [35], participants noted how spatial arrangement in virtual stores such as placing expensive items adjacent to cheaper ones leverages framing effects [54]. The theme of UI and Sensory Misdirection also resonates with the category of Aesthetic Manipulation [28], particularly when sound and animation make storefronts emotionally salient. These results emphasise that deceptive design is not confined to economic exchange but pervades the spatial, aesthetic, and narrative layers of game worlds. This is particularly important in immersive and socially embedded environments where the boundary between play and purchase becomes increasingly blurred.

6.4 Structural Reinforcement and Ethical Tensions

Beyond isolated mechanics, participants also described broader structural processes that sustained engagement over time. Recognition of manipulative practices often triggered negative affect (irritation, annoyance) and broader ethical concern, particularly about children and vulnerable users

who may be less able to recognise or resist emotionally persuasive or habit-forming monetisation systems. Self Determination Theory (SDT; [17]) helps explain part of this response: players perceive autonomy and relatedness as undermined by manipulative prompts, producing dissatisfaction, but the moral dimension extends beyond SDT: participants explicitly attributed intent to designers and framed some practices as exploitative, indicating ethical judgements that implicate developers and platforms.

Further, participants described three longitudinal mechanisms that sustain play: habit loops and streaks (normalising daily return), sunk-cost dynamics (continuing to play/spend to justify prior investment), and obfuscation of value that mask real-money cost. Cognitive-dissonance framing (CDT; [25]) helps explain rationalisations after investment; players align behaviour with prior spending. These mechanisms create inertia and explain why DPA does not simply translate into protection against IGD: even when players are dissatisfied, they keep returning or spending. From an HCI perspective, these dynamics are not simply individual failures of self-control but structural properties of interaction design (frequency, persistence, reward scheduling, and transparency) that can be redesigned.

6.5 Implications for Design and Policy

Our findings extend existing deceptive design taxonomies (e.g., [8, 28, 35, 59]) and reveal a complex interplay between game design strategies and player experiences, highlighting both the sophistication of manipulative mechanics and the ambivalence they generate. Grounded directly in players' lived experiences and accounts of frustration, confusion, and perceived unfairness, we translated themes into practical design and policy considerations (Table 3) to shift the focus of intervention away from player education alone and towards how systems are designed in the first place. Rather than replacing existing deceptive design taxonomies, our player-centred taxonomy complements prior frameworks by foregrounding how manipulative mechanics are experienced, interpreted, and rationalised during gameplay itself. These are not intended to eliminate enjoyable gameplay features such as surprise, collection, progression, or social reward. Rather, they identify areas where players perceived monetisation systems as becoming coercive, misleading, or disproportionately harmful, particularly for children and vulnerable users. To make these implications as actionable as possible for game designers and policymakers, we illustrate four prioritised recommendations, each corresponding to specific deceptive design patterns identified in our analysis.

6.5.1 Monetary Transparency and Value Clarity. Participants consistently reported confusion around multiple currencies, conversion rates, and loot-box value opacity (Clip A). This supports a clear intervention: to mitigate harm, designers should ensure that all in-game purchases are presented with clear, consistent currency conversions, and that costs are displayed prominently with real-money value. Policy interventions could mandate such monetary transparency with standardised disclosure of costs and probability information, echoing regulatory recommendations by the European Commission [21], to protect vulnerable groups, including children. Monetary transparency and clear presentation of costs parallel elements of the EU's Unfair Commercial Practices Directive [22], which prohibits practices likely to distort consumer choices, including misleading urgency or hidden charges, suggesting legal as well as ethical bases for design transparency. Similarly, principles from data protection law (e.g., GDPR's transparency and 'design by default' requirements) emphasise clear, unambiguous interface cues that do not mislead users about costs, personal data usage, or consent conditions [9].

6.5.2 Limits on Affective Persuasion. Participants frequently reported feeling manipulated by NPCs or in-game events that leveraged guilt, flattery, or challenge (affective manipulation and

Table 3. Player-centred taxonomy with design considerations and policy directions

Themes and Subthemes	Deceptive Design Practices	Player Experiences / Responses	Actionable Design Interventions	Potential Policy Directions
1.Manipulative Design Strategies				
Overt Greed and Predatory Monetisation	Aggressive monetisation, pay-to-win mechanics	Pressure to spend, “pay-to-win” frustration	Transparent pricing, avoid pay-to-win mechanics	Inform clearer disclosure of costs; restrict exploitative monetisation targeting minors
Temporal Tricks	Long grind cycles, streaks, play-by-appointment	Stress from time-gated rewards, pressure to log in daily	Optional progression paths, reduce mandatory daily logins	Regulate exploitative pacing; protect child-targeted games
Affective Manipulation	NPC guilt-tripping, anthropomorphic persuasion	Guilt, persuasion by NPCs, emotional pressure	Limit coercive interactions, provide opt-out options	Set ethical limits for emotional persuasion in monetised interactions
UI and Sensory Misdirection	Misleading UI, visual/sound cues, celebratory reinforcement	Attraction to bright visuals, sounds, celebratory effects	Neutral placement of monetised items, reduce misleading cues	Require clear disclosure of monetised elements; limit deceptive UI design practices
2.Player Responses and Ethical Concerns				
Deceptive Design Pattern Dissatisfaction	Overuse of dark patterns that compromise experiences and fairness	Annoyance, frustration, disengagement	Reporting mechanisms, transparent design	Monitor prevalence of deceptive design patterns; enforce accountability
Moral Discomfort for Vulnerable Players	Targeting minors, manipulative emotional appeals	Ethical concern, especially for vulnerable players	Avoid targeting children and vulnerable players	Protective regulations for children; ethical monetisation guidelines
3.Ambivalent Experiences of Loot Boxes				
Artificial Scarcity	Limited-time or rare item mechanics	Excitement from rare rewards, social capital pressure	Transparency about odds; provide alternative rewards	Require disclosure of drop rates; restrict manipulative scarcity cues

Risk and Reward	Random reward mechanics	Thrill vs. gambling-like exploitation	Educate players; optional reward systems	Gambling regulation considerations; age restrictions
4.Sustained Engagement and Habit Loops and Streaks	Daily login rewards, re-inforcement loops	Compelled to log in repeatedly	Optional streaks; breakable routines	Regulate manipulative habit-forming mechanics
Sunken-Cost Fallacy and Transactional Harm	Escalating cost curves, “invested” progression	Continued play due to prior investment	Provide clear progress/value metrics	Prevent exploitative sunk-cost exploitation
Obfuscation of Value	Multiple currencies, hidden prices	Confusion about costs or in-game currencies	Value clarity, real-money equivalents	Mandate transparent in-game pricing

interpersonal persuasion). Therefore, to ensure engagement is voluntary rather than compliance-driven, designers should limit emotionally coercive tactics, particularly when anthropomorphised characters are used to encourage monetised engagement. Regulatory guidelines could also provide frameworks to help establish clearer boundaries regarding acceptable use of persuasive character design in interactive commercial games, aligning with broader ethical standards in advertising and digital media.

6.5.3 Reducing Deceptive Interface Affordances. Across clips, participants described attention-grabbing visuals, celebratory feedback, and misleading interface hierarchies as prompting impulsive purchases or choices (UI and sensory misdirection, physical placement). Designers should adopt UI best practices that prioritise informational clarity over persuasive emphasis and minimise deceptive affordances to enable players’ informed choices, such as neutral placement of items, non-intrusive notifications, reducing exaggerated reward animations and flashy cues that imply scarcity or urgency. The goal is not to remove engaging visual feedback from games altogether, but to reduce interface designs that intentionally blur the distinction between enjoyable play and pressured spending. Policymakers could further incorporate these principles into industry codes and accountability frameworks, treating misleading UI cues as a form of consumer interface misrepresentation, similar to misleading advertising practices.

6.5.4 Addressing Habit-Forming Reward Structures. Participants described that temporal tricks and habit loops such as daily login streaks or artificially extended grind can create obligation and routine rather than choice, disproportionately benefiting monetisation rather than player enjoyment and wellbeing. Therefore, reward systems should aim to preserve player enjoyment and long-term engagement without relying on coercive scheduling structures that create obligation, anxiety, or fear of missing out. Game developers can design reward systems that are predictable and proportional, providing optional, clearly signposted paths for progression without mandatory spending. For recurrent spenders, multi-step confirmations should be required and easy opt-outs from streak-based prompts should be enabled. Policy interventions might also establish safeguarding limits on exploitative reward pacing in games marketed to minors or vulnerable populations.

6.5.5 Accountability and Ongoing Evaluation. Participants repeatedly described uncertainty, frustration, and ethical concern around monetisation systems they nonetheless continued to engage

with. This tension (particularly evident in relation to loot boxes, currency opacity, and habit-forming reward structures) suggests that harm is not primarily driven by lack of awareness, but by the persistence of structural design features that shape behaviour even when they are recognised as problematic. Ethical game design therefore requires ongoing evaluation and accountability. Because many of these systems are commercially advantageous for developers, meaningful change may require external accountability mechanisms including platform standards, transparency requirements, age-appropriate protections, and regulatory safeguards rather than relying solely on voluntary industry uptake. Designers should implement player feedback mechanisms to identify areas where mechanics are perceived as manipulative, enabling iterative refinement. Regulators could incentivise transparency reporting, ensuring developers document how monetisation features impact player behaviour, particularly among vulnerable populations. While comprehensive regulation specific to deceptive design is still evolving, emerging policy discussions, including in works such as [37], which collected regulatory responses from the GDPR to the Digital Services Act, reflect increasing attention to deceptive design beyond traditional consumer protection, indicating that the ethical and legal scrutiny of manipulative mechanics in interactive entertainment may be accelerating.

Overall, these implications suggest that addressing deceptive design in games cannot rely solely on approaches based on disclosure, awareness, or assumptions of rational consumer decision-making. While transparency mechanisms such as probability disclosures and clearer pricing may support informed choice [56], our findings indicate that structural design features including reinforcement loops, social pressure, affective persuasion, and interface misdirection continue to influence behaviour even when players recognise them as manipulative. As such, effective harm reduction likely requires a combination of ethical design standards, platform accountability, and targeted protections for vulnerable populations that address the systemic properties of monetised game systems rather than focusing exclusively on player awareness or individual self-regulation.

6.6 Limitations and Future Work

This study has several limitations. First, the use of short gameplay clips, while ensuring consistency across participants, cannot fully replicate the immersive and time-based dynamics of live play. Some deceptive design patterns such as grinding or time-gating may be less salient in short exposures. Second, the sample was primarily young, white adults recruited online and based in the UK, with a predominance of female participants, limiting generalisability to other demographics, including children, who may be more vulnerable to persuasive design [34]. Gendered differences in gaming cultures, monetisation exposure, and attitudes towards deceptive design may affect how manipulative mechanics are perceived and discussed, and future work should examine these dynamics in more demographically balanced and cross-cultural samples. Third, clips were presented in a fixed sequence to keep cognitive context and framing consistent and reduce between-subject variation, but this risks order-related bias such as priming. Further, while the combination of qualitative and quantitative methods provides a robust picture of player perceptions, behavioural outcomes were self-reported and therefore susceptible to recall effects and social desirability bias, particularly when discussing problematic play or spending behaviours. Participants may have underreported behaviours perceived as excessive, impulsive, or harmful. If so, the observed relationships between loot-box engagement and IGD symptoms may represent conservative rather than inflated estimates of these associations. Future work should therefore triangulate self-report data with in-game behavioural records and longitudinal designs to better capture how deceptive design practices affect play over time.

In this study, we demonstrate a scalable, reproducible mixed-methods protocol (standardised gameplay clips, forced-choice detection, open responses, and standard behavioural measures) that

will benefit the wider HCI and games research community to study deceptive design patterns in gameplay rather than as isolated interface interactions. Future research can replicate findings across platforms and populations, for example, cross-cultural studies could explore how perceptions of manipulative design vary with social norms and regulatory regimes, and relatedly whether social norm-based interventions [3, 12] could promote positive behavioural change. Future research should also extend this work by testing deceptive design pattern detection in ecologically valid gameplay contexts, including VR and metaverse environments, where embodied interaction and interpersonal persuasion may be amplified. Finally, collaboration with industry stakeholders may help to co-design interventions such as currency transparency and probability disclosures that balance monetisation with ethical responsibility.

7 Conclusion

Players recognise many deceptive design patterns, but recognition alone does not reliably protect against harmful gameplay. Loot-box engagement emerges as a behavioural risk factor for gaming-disorder symptoms, while deceptive design pattern awareness provides limited behavioural protection because hedonic, social and structural incentives sustain play. We contribute (1) a player-centred taxonomy of game deceptive design patterns grounded in in-context detection and participant reasoning, (2) integrated qualitative and quantitative evidence connecting loot-box use and gaming-disorder symptoms while demonstrating the limits of awareness-based protection, and (3) concrete design heuristics and policy recommendations to reduce harm, emphasising transparency, value clarity, and protective measures for vulnerable players and informed choices. Together, these findings suggest that improving player awareness alone is insufficient as a consumer protection strategy. Mitigating harm does not require removing pleasurable gameplay features altogether, but instead requires structural, regulatory, and UI-level interventions that reduce coercive, misleading, or exploitative implementations, particularly for vulnerable players. Our mixed-methods protocol further provides a reproducible approach for evaluating deceptive design in gameplay contexts. This work offers researchers, designers and regulators empirically grounded routes to foster ethical game design and healthier play environments.

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