

# The Prevalence and Co-occurrences of Dark Patterns in Mobile Free-to-Play Games

**Zhiyu Chen**

Faculty of Social Sciences, KU Leuven  
Parkstraat 45  
Leuven, Belgium  
[zychen0777@gmail.com](mailto:zychen0777@gmail.com)

**Minxing Wang**

School of Journalism & Communication, Peking University  
No.5 Yiheyuan Road, Peking University  
Beijing, China  
[minxingwang25@stu.pku.edu.cn](mailto:minxingwang25@stu.pku.edu.cn)

**Leon Y. Xiao**

School of Creative Media, City University of Hong Kong  
118 Tat Hong Avenue, Kowloon Tong  
Hong Kong, Hong Kong SAR, China  
[leon.xiao@cityu.edu.hk](mailto:leon.xiao@cityu.edu.hk)

## Keywords

Dark Patterns; Mobile Gaming; Game Design; Monetization

## EXTENDED ABSTRACT

Dark Patterns (DPs), also referred to as “deceptive design patterns,” are design strategies that manipulate, deceive, or pressure users into making decisions that may not align with their best interests (Gray et al., 2018). In the context of video games, Zagal et al. (2013, 7) define them as intentionally implemented design choices that negatively affect players without their informed consent. DPs have attracted growing attention from scholars, policymakers, and the public due to their widespread presence and often ambiguous nature, which complicates regulatory efforts and limits the effectiveness of user awareness alone.

Existing research on dark patterns in mobile games primarily relies on player self-reports (e.g., Hadan et al., 2024; Veiga et al., 2025). However, the rigor of users’ self-reports is being challenged (Di Geronimo et al., 2020). Moreover, most studies focus on the game as a whole rather than examining how various dark patterns interact within specific gameplay features. In practice, a game feature usually contains several co-functioning dark patterns, and their interplay exactly complicates the persuasive impact on users (Gray et al., 2025). While research in other fields - such as e-commerce - has begun to explore the intersectionality of dark patterns through content analysis (e.g., Kelly & Rubin, 2024), similar approaches remain underdeveloped in the mobile gaming context. Thus, there is still a need for a more rigorous and representative mapping of dark pattern prevalence in mobile games, alongside a systematic analysis of their design-level interactions, to support future empirical and regulatory work. We present our Research Questions (RQ):

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RQ1: How prevalent are (different kinds of) dark patterns in mobile free-to-play games?

RQ2: How do dark patterns in mobile free-to-play games co-occur in design?

This study conducted a content analysis of the top 50 grossing mobile Free-to-play (F2P) games on Google Play in the US as of 16 June 2025. The first author played and recorded each game for approximately 1 hour ( $M = 1:03:07$ ,  $SD = 0.002$ ). Then, the second author deployed a systematic coding method based on the ADD (App Dark Design) framework by Fitton and Read (2019), with modifications.

All games examined in our sample contain dark pattern design elements to varying degrees. Four types of DP—Psychological Manipulation, Intermediate Currencies, Pay for Expendable Updates, and Play by Appointment—are the most prevalent, with more than 80% of games containing all four types. Notably, on average, each game includes over 6 distinct instances of psychological manipulation. Using Spearman correlation, we examined the co-occurrences. Psychological Manipulation shows strong correlations with all 6 Monetary DPs and Play by Appointment. Moreover, DPs within the Monetary category also exhibit high intercorrelations.

The study highlights the prevalence of Psychological Manipulation, underscoring inconsistencies in dark pattern taxonomies and the blurred line between manipulation and persuasion. The frequent co-occurrence of Monetary Dark Patterns with other types suggests a deep connection to game monetization models. Furthermore, the findings on Intermediate Currencies in casual mobile games highlight a trend toward “financialization,” questioning the rationality versus manipulation of players’ in-game spending optimization. By systematically mapping the components and interactions of DPs at the design level, this study contributes to a more precise theoretical framework for identifying dark patterns in mobile games, and to support ongoing efforts in assessment, regulation, and education.

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