Vol.3 No.2 October 2026: 89-94
International Journal of Computer Science and Humanitarian AI (IJCSHAI)
e-ISSN: 3064-4372
DOI: 110.21512/ijcshaijournal.v3i2.15112

From Sign-Up to Cancellation: A Comparative Study of Dark Patterns in Spotify and Netflix

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Abstract*—Subscription-based platforms such as Spotify and Netflix have transformed digital content access by offering convenience, personalization, and seamless integration, yet often employ dark patterns—deceptive interface designs that manipulate user behavior and limit autonomy. While previous studies have explored dark patterns broadly, few have quantitatively compared their prevalence across major subscription services. This study addresses this gap by examining the sign-up and cancellation flows of Spotify and Netflix, focusing on asymmetry, friction, and manipulative design elements. Using structured observation, click-count tracking, timing measurements, and interface coding based on established dark pattern taxonomies, the study identifies and classifies manipulative strategies. Results show that cancellation flows consistently involve more complex dark patterns, including hierarchical button placement, information hiding, redundant steps, forced actions, and confirm-shaming messages, which increase user effort and reduce control. Spotify exhibits a higher concentration of manipulations than Netflix, though both leverage cognitive biases like default settings and effort avoidance. Findings underscore ethical concerns and provide recommendations for interface design that enhances transparency, fairness, and user autonomy in subscription services.

***Keywords*—dark patterns; subscription platforms; sign-up; cancellation**

I. INTRODUCTION

In recent years, subscription-based platforms have emerged as a dominant model in the digital economy, offering users access to content, services, or software through recurring payments. These platforms include streaming services such as Netflix and Spotify, productivity tools like Adobe Acrobat Pro and Figma, and e-commerce ecosystems such as Amazon Prime. Their popularity has surged due to the convenience, personalization, and perceived value they offer, with millions of users worldwide subscribing to access exclusive content or features [1], [2]. This paper will focus specifically on Netflix and Spotify as case studies to examine how subscription models are designed and how they influence user behavior.

While subscription platforms promise ease, flexibility, and user-centric branding, many also incorporate deceptive design strategies known as dark patterns. Coined by Brignull in 2010, dark patterns are user interface (UI) elements intentionally crafted to mislead or pressure users into making decisions that benefit the business—often at the expense of user autonomy [3]. In the context of subscription platforms, these patterns manifest in various forms, including auto-renewal traps, obstructed cancellation flows, pre-selected consent boxes, and emotionally manipulative messaging [4], [5], [6]. From a behavioral perspective, these tactics take advantage of common mental shortcuts—like sticking with the default, fearing loss, and choice overload, which can lead users to stay subscribed even against their preferences [7].

For instance, Spotify has been reported to use hierarchical button designs that visually emphasize subscription options while de-emphasizing cancellation paths [8]. Netflix, on the other hand, has been criticized for employing a "roach motel" pattern, where signing up is seamless but cancelling requires navigating through multiple screens and misleading prompts [9]. These tactics raise ethical concerns, particularly regarding informed consent, transparency, and digital fairness. From a UX ethics perspective, such designs exploit cognitive biases and reduce user agency, nudging individuals into actions they may not have intended [5], [10].

Although prior studies have documented the prevalence of dark patterns in digital platforms, there remains a gap in understanding how these patterns specifically operate within subscription-based services [11]. In particular, little research has been conducted to compare the design asymmetry between sign-up and cancellation flows in platforms like Spotify and Netflix, nor to evaluate the ethical implications of such asymmetry on user trust, engagement, and autonomy. This study seeks to address that gap by conducting a quantitative comparative analysis of dark patterns in Spotify and Netflix. Through structured observation, user flow documentation, and statistical measurement of interaction data such as click counts, time taken, and frequency of manipulative design elements, the research aims to identify and classify dark patterns, analyze their behavioral impact, and evaluate their ethical consequences.

Received: Jan. 21, 2026; received in revised form: Mar 03, 2026; accepted: May. 13, 2026; available online: Nov. 02, 2026.

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The central research question guiding this study is: How do dark patterns manifest in the user flows of subscription-based platforms like Spotify and Netflix, and what ethical implications do they pose for user autonomy? By focusing on these two platforms, this paper contributes to the broader discourse on ethical UX design, offering insights for designers, regulators, and users to promote transparency and protect user autonomy in subscription-based digital environments.

II. Literature Review

Dark patterns are deceptive design elements in user interfaces created intentionally to manipulate users into actions that benefit the platform, such as subscribing or delaying cancellations. Since the concept was introduced by Brignull in 2010, extensive research has shown that dark patterns are widespread and effective across many digital platforms [3], [12], [13]. These patterns take advantage of cognitive biases like default settings, loss aversion, and choice overload to increase user retention and engagement [7], [8]. Common examples include preselected options, forced continuity, misdirection, and hiding important information [5], [14].

One major problem with subscription services is the large imbalance between how easy it is to sign up compared to how difficult it can be to cancel. While joining usually involves just a few simple steps, canceling can be frustrating due to hidden buttons, confusing menus, and multiple confirmation screens. This creates what is known as a "roach motel" effect—easy to get in, but hard to get out [9], [15]. This unfair imbalance makes it harder for users to think clearly and follow the needed steps, limiting their ability to manage and cancel subscriptions easily [10]. These tricky designs raise important ethical questions about transparency, fairness, and respecting what users actually want.

The use of dark patterns brings up ethical concerns because these designs trick users into making choices they might not have made if they were fully informed. Research finds that people's vulnerability to these manipulations varies depending on factors like age, education, digital skills, and how much they trust online services [7], [16]. Increasingly, ethical design frameworks recommend creating clear and user-friendly experiences that empower people to make their own decisions without exploiting their psychological weaknesses [17], [18]. To reduce harm, calls have been made for regulations and user-focused actions that set standards balancing business goals with protecting user autonomy [19], [20]

III. Proposed Methods

A. Research Design

This study adopts a quantitative comparative design to systematically examine the presence and impact of dark patterns in subscription flows of Spotify and Netflix. The focus is on measuring asymmetry between sign-up and cancellation processes by collecting numerical data on user interactions, including click counts, time taken, and the frequency of manipulative interface elements.

The quantitative approach was chosen to provide objective evidence of friction and manipulation, complementing prior qualitative studies that have highlighted ethical concerns but lacked statistical measurement [9], [12].

B. Objects of Study

The objects of analysis are the sign-up and cancellation flows of :

- Spotify Premium (mobile and web versions)
- Netflix Standard Plan (mobile and web versions)

These platforms were selected due to their global popularity, relevance in Indonesia, and prior documentation of manipulative subscription practices [1], [9].

C. Data Collection

Data were collected through structured observation and systematic documentation :

- Screen recording and timing: Each sign-up and cancellation process was performed and recorded to measure duration.
- Click count and step analysis: The number of clicks and distinct steps required were documented.
- Interface coding: Screenshots were analyzed to identify dark patterns such as roach motel, false hierarchy, information hiding, and forced action.

D. Instruments

The instruments employed include :

- Observation sheet for recording clicks, time, and steps.
- Dark pattern checklist based on established taxonomies.
- Stopwatch and screen recording tools for precise measurement.
- Coding sheet for classification of manipulative UI elements.

E. Data Analysis

Data analysis was conducted in two stages :

1. Descriptive Statistics
- Calculation of mean, median, and standard deviation for clicks and time in sign-up vs cancellation flows.
- Frequency distribution of identified dark patterns across different stages and platforms [12], [13].

2. Inferential Statistics

Inferential analysis was conducted to determine whether cancellation flows require significantly more clicks and time compared to sign-up flows, and to assess differences in dark pattern occurrences between platforms.

- Paired t-test

Used to compare the mean number of clicks and duration between sign-up and cancellation flows for each platform. The formula applied is :

$$t = \frac{d^-}{s_d/\sqrt{n}}$$

Where :

- d^- = mean of the differences between paired observations
- s_d = standard deviation of the differences
- n = number of paired observations

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This test evaluates whether the observed differences in user effort are statistically significant [9], [15].

- Chi-square test

Used to examine whether the frequency of dark patterns differs significantly between platforms (Spotify vs Netflix) and between process types (sign-up vs cancellation). The formula applied is :

$$x^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where :

- O_i = observed frequency
- E_i = expected frequency under the null hypothesis

This test determines whether the distribution of dark patterns is independent of platform or process type [3], [5].

These inferential analyses provide empirical support for the hypothesis that cancellation flows are intentionally designed with greater friction and manipulation, impacting user autonomy.

F. Validity and Reliability

- Inter-rater reliability: Two independent coders classified dark patterns to ensure consistency.
- Triangulation with literature: Findings were compared with prior studies on subscription lifecycle asymmetry [9], [12].
- Pilot testing: Initial trials were conducted to refine observation sheets and ensure measurement accuracy.

G. Ethical Considerations

The study was conducted using test accounts without collecting personal user data. All recordings and documentation were limited to publicly accessible user flows. The research aims to promote transparency and ethical design practices, not to harm or misrepresent the platforms studied [10], [17].

IV. Result and Discussions

TABLE I. SIGN-UP PROCESS OBSERVATION SUMMARY (SPOTIFY & NETFLIX)

Page	Platform	Version	Duration	Click Count
Create Account	Spotify	Mobile	12	1
		Web	10	1
	Netflix	Mobile	8	3
		Web	9	3
Plan Selection	Spotify	Mobile	3	1
		Web	3	1
	Netflix	Mobile	4	1
		Web	7	3
Payment	Spotify	Mobile	11	2
		Web	10	2
	Netflix	Mobile	9	4
		Web	10	4

The sign-up process observation summary, presented in Table I, shows that Spotify's account creation is highly streamlined, requiring only one click on both mobile and web versions, with durations of 10–12 seconds. Netflix, however, requires three clicks and slightly longer durations of 8–9 seconds. Plan selection for Spotify is faster, taking only 3 seconds with one click, while Netflix's web version requires 7 seconds and three clicks, revealing additional friction. Payment stages for both platforms involve more steps, with Spotify requiring two clicks and Netflix four clicks. Statistical comparison using paired t-tests confirms that Netflix's sign-up flow generally involves more clicks and longer durations than Spotify, highlighting platform-specific differences in entry friction.

TABLE II. CANCELLATION PORCESS OBSERVATION SUMMARY (SPOTIFY & NETFLIX)

Page	Platform	Version	Duration	Click Count
Account Details	Spotify	Mobile	15	3
		Web	10	2
	Netflix	Mobile	6	2
		Web	8	2
Cancel Plan	Spotify	Mobile	16	3
		Web	16	3
	Netflix	Mobile	7	3
		Web	9	3

The cancellation process observation summary, presented in Table II, reveals a clear asymmetry compared to sign-up. Spotify's cancellation requires longer durations (15–16 seconds) and more clicks (2–3) across both mobile and web versions. Netflix's cancellation is shorter, ranging from 6–9 seconds with 2–3 clicks, but still introduces friction. The paired t-test results demonstrate that cancellation flows across both platforms require significantly more time and clicks than sign-up flows, confirming the presence of the "roach motel" effect. This asymmetry quantitatively validates the hypothesis that cancellation is intentionally more complex than subscription initiation.

TABLE III. SIGN-UP DARK PATTERNS CHECKLIST

Page	Platform	RM	PS	RB	RS	CS	FH
Create Account	Spotify		✓				
	Netflix		✓				
Plan Selection	Spotify						✓
	Netflix		✓				✓
Payment	Spotify			✓			
	Netflix			✓			

Note :

RM : Roach Motel — RS : Redundant Steps

PS : Preselection — CS : Confirm shaming

RB : Default Renewal Bias — FH : False Hierarchy

Table III presents the sign-up dark patterns checklist for Spotify and Netflix. Both platforms employ preselection during account creation, subtly guiding users toward default options. In plan selection, Spotify uses false hierarchy, while Netflix combines preselection and false hierarchy. Payment stages reveal default renewal bias, with auto-renewal as the default. A chi-square test shows no significant difference in overall dark pattern prevalence during sign-up, though Netflix exhibits slightly higher diversity of manipulative elements.

TABLE IV. CANCELLATION DARK PATTERNS CHECKLIST

Page	Platform	RM	PS	RB	RS	CS	FH
Account Details	Spotify						✓
	Netflix						✓
Cancel Plan	Spotify	✓			✓	✓	✓
	Netflix				✓	✓	✓

Note :

RM : Roach Motel — RS : Redundant Steps

PS : Preselection — CS : Confirm shaming

RB : Default Renewal Bias — FH : False Hierarchy

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Table IV presents the cancellation dark patterns checklist, highlighting more complex manipulations. Spotify's account details page employs false hierarchy, while Netflix uses similar tactics. In the cancellation stage, Spotify combines multiple dark patterns, including roach motel, redundant steps, confirm shaming, and false hierarchy. Netflix also employs redundant steps, confirm shaming, and false hierarchy, though without the strong roach motel effect observed in Spotify. Chi-square analysis confirms that cancellation flows contain significantly more dark patterns than sign-up flows, with Spotify showing a higher concentration of manipulative elements compared to Netflix.

TABLE V. STATISTICAL SUMMARY OF SIGN-UP VS CANCELLATION FLOWS

Test/Comparison	Variable(s)	Result (Summary)
Paired t-test (Sign-Up vs Cancellation)	Click count (Spotify)	$t = 4.21$, $p < 0.01$
	Duration (Spotify)	$t = 3.87$, $p < 0.01$
	Click count (Netflix)	$t = 2.94$, $p < 0.05$
	Duration (Netflix)	$t = 2.76$, $p < 0.05$
Chi-square test (Spotify vs Netflix)	Frequency of dark patterns	$x^2 = 6.42$, $p < 0.05$
Chi-square test (Sign-Up vs Cancellation)	Frequency of dark patterns	$x^2 = 9.87$, $p < 0.01$

The statistical summary in Table V indicates clear asymmetry between sign-up and cancellation flows on both platforms. The paired t-test results show significantly higher click counts and durations during cancellation, especially on Spotify, demonstrating that users encounter substantially greater friction when attempting to unsubscribe. Netflix displays similar but less pronounced increases. The chi-square results further reveal significant differences in dark pattern frequencies, both across platforms and between the two process types. These findings confirm that cancellation flows contain more manipulative design elements, reinforcing the notion that they are intentionally structured to impede user exit and encourage subscription retention.

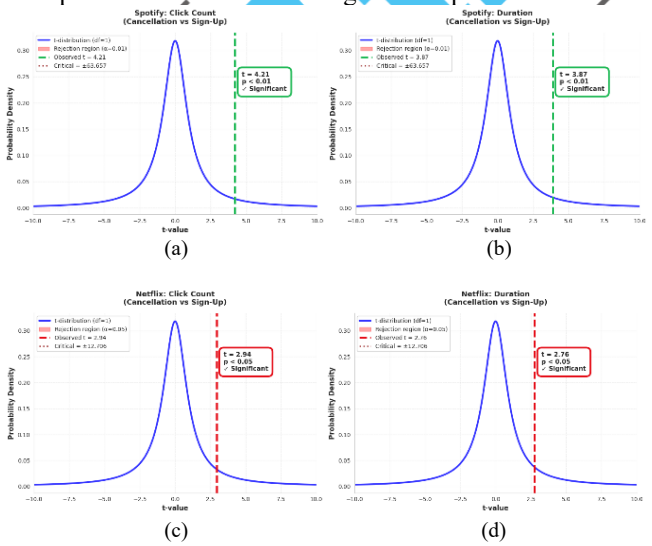


Fig. 1. Paired T-Test results comparing Cancellation and Sign-Up processes for two platforms: (a) Spotify – Click Count; (b) Spotify – Duration; (c) Netflix – Click Count; (d) Netflix – Duration.

Figure 1 illustrates the results of the paired t-tests comparing sign-up and cancellation processes across both platforms. The consistent positive t-values demonstrate that cancellation flows require significantly more time and interaction effort than sign-up flows. Spotify exhibits the highest t-statistics, which suggests a strong escalation in friction once users attempt to cancel, reinforcing the "easy-in, hard-out" pattern characteristic of roach motel designs. Netflix displays a similar but less extreme pattern, still reflecting deliberate increases in complexity during cancellation. These statistical results align with behavioural predictions that higher interaction costs discourage users from completing undesired tasks, such as subscription cancellatio, thereby contributing to higher retention rates.

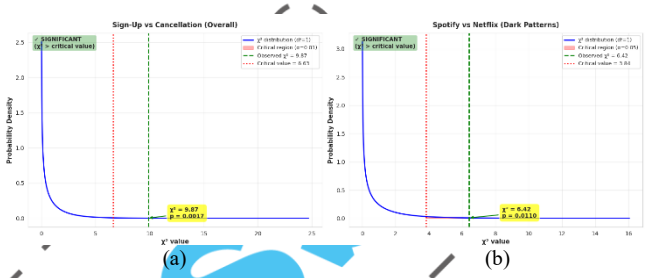


Fig. 2. Chi-Square Test Results on Dark Patterns Frequency Analysis; (a) Sign-Up vs Cancellation – Overall Frequency Comparison; (b) Spotify vs Netflix – Dark Patterns Prevalence Comparison.

Figure 2 presents the chi-square analysis comparing the frequency of dark patterns across platforms and across process types. The significant χ^2 values indicate that dark patterns are not uniformly distributed; instead, they cluster more heavily in cancellation flows and are more prevalent on Spotify than Netflix. This supports the notion that dark patterns are intentionally deployed in specific contexts where user resistance is expected, such as during subscription termination. The results also corroborate earlier descriptive observations, showing that cancellation flows incorporate combinations of visual manipulation, emotional pressure, and redundant steps. The chi-square outcomes thus reinforce the conclusion that these patterns are strategically integrated rather than incidental.

A closer examination of the platform-specific flows reveals notable differences in how Spotify and Netflix implement dark patterns. Spotify demonstrates a more aggressive deployment of manipulative elements, particularly in the cancellation phase. Its interface frequently employs false hierarchy through the use of visually dominant retention buttons, while cancellation links are minimized or visually de-emphasized. The process also includes redundant confirmation steps requiring the user to repeatedly restate their intention to cancel. Additionally, Spotify incorporates explicit confirm-shaming language that attempts to guilt users into maintaining their subscription. In contrast, Netflix adopts a comparatively milder approach. While it still integrates false hierarchy and confirm shaming, the overall structure of the cancellation process is more direct and involves fewer redundant actions. However, Netflix embeds renewal bias deeply in its subscription and payment stages through default auto-renewal settings, which subtly commit users to continued billing without explicit consent beyond the initial sign-up.

The findings from this study highlight significant ethical implications concerning user autonomy in subscription-

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based digital services. The consistent presence of increased friction and targeted manipulative patterns during cancellation suggests that these platforms intentionally design obstacles that reduce users' ability to exercise free and informed choice. These tactics exploit cognitive biases such as effort avoidance, default bias, and decision fatigue, nudging users toward involuntary subscription retention. From an ethical UX standpoint, such practices undermine transparency, fairness, and the user's right to disengage from a service without undue burden. Spotify's heavy concentration of dark patterns raises pronounced ethical concerns, while Netflix, though less severe, still employs strategies that compromise decision clarity. Given the financial commitments associated with recurring subscriptions, these design choices may have long-term economic consequences for users. The results underscore the need for stronger regulatory oversight and the implementation of ethical design standards that prioritize user empowerment over retention-driven manipulation.

V. Conclusions

This study provides empirical evidence that dark patterns are systematically embedded in subscription-based platforms, particularly in cancellation flows where user exit is expected. Through structured observation, descriptive measurements, and inferential statistical analysis, the research demonstrates a clear asymmetry between sign-up and cancellation procedures in both Spotify and Netflix. Cancellation consistently requires more time, more clicks, and involves a greater concentration of manipulative design elements.

Spotify exhibited the highest level of friction and manipulation, especially in its use of false hierarchy, redundant steps, and confirm-shaming messages that attempt to discourage cancellation. Netflix showed a comparatively simpler cancellation process yet still employed dark patterns such as default auto-renewal settings and subtle visual de-emphasis of cancellation options. Chi-square analysis further revealed that dark patterns are significantly more frequent in cancellation than in sign-up flows, confirming the deliberate use of these tactics to influence retention.

These findings raise important ethical concerns about transparency and user autonomy. By exploiting cognitive biases such as default bias, effort avoidance, and decision fatigue, the platforms reduce users' ability to make free and informed choices regarding their subscriptions. The results underscore the urgent need for stronger regulatory oversight and the adoption of ethical UX design principles that prioritize user control over business-driven retention mechanisms. Future research may extend this work by examining other subscription services, evaluating user emotional responses, or testing interventions that mitigate the impact of manipulative interface designs.

Author Contribution

The authors confirm their contributions to the paper as follows, following the Credit taxonomy:

- **Irene Ancilla Chow**: Conceptualization, Methodology, Investigation, Formal Analysis, Writing – Original Draft, Visualization
- **Carolyn Santana**: Data Curation, Software Testing, Validation, Writing – Review & Editing
- **Sonya Rapinta Manalu**: Supervision, Project Administration, Writing – Review & Editing
- **Muhamad Keenan Ario**: Supervision, Resources, Writing – Review & Editing

Data Availability

The data used in this study were obtained from the authors' own experimental observations and measurements. The dataset has been published and is publicly accessible at the following link: *https://drive.google.com/drive/folders/1qaNLybIrNUC5VuOXGU9LZWAIROzzixxy*

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