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Dark Patterns and Unconscious Purchase Decisions: The Mediating Effect of Emotional Manipulation in Indonesian E-Commerce

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Abstract

The Objectives – Dark patterns deceptive interface design techniques embedded in digital shopping platforms have attracted growing scholarly attention due to their capacity to subvert consumer autonomy. However, the psychological mechanism through which dark patterns translate into unconscious purchase decisions remains insufficiently theorised.

The Methods/approaches – This study examines the direct effect of dark patterns on unconscious purchase decisions and the mediating role of emotional manipulation in this relationship. Using a quantitative approach, data were collected via structured questionnaire from 220 active users of digital shopping platforms in Indonesia and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM).

The Results – **i**ndicate that dark patterns positively and significantly influence both emotional manipulation and unconscious purchase decisions. Emotional manipulation significantly mediates the relationship between dark patterns and unconscious purchase decisions, with the mediation type confirmed as partial. The model explains 61% of variance in unconscious purchase decisions.

The Research Implications – These findings extend deceptive design theory by foregrounding affect as a central mechanism of consumer exploitation and carry practical implications for platform regulation, digital consumer protection, and ethical interface design.

Keywords: Dark Patterns, Emotional Manipulation, Unconscious Purchase Decision, Deceptive Design, Consumer Behavior

1. Introduction

The rapid expansion of digital commerce has fundamentally transformed the architecture of consumer choice. Globally, e-commerce transactions exceeded USD 5.8 trillion in 2023, with Southeast Asian markets including Indonesia recording some of the highest growth rates in the world (Statista, 2024). Within this digital marketplace, consumers navigate an increasingly complex web of interface design choices that shape their behaviour in ways that are often subtle, imperceptible, and, in many cases, deliberately manipulative.

The term 'dark patterns' was coined by user experience designer Harry Brignull (2010) to describe interface design techniques that trick or manipulate users into making decisions that serve the business interest of the platform at the expense of the user's own interest. Canonical examples include confirmshaming (framing opt-out options in guilt-inducing language), urgency and scarcity cues (false countdown timers and stock warnings), roach motel structures (easy subscription enrolment but obscured cancellation), hidden costs revealed only at checkout, and misdirection through visual salience manipulation (Mathur et al., 2019; Gray et al., 2018). Empirical research has documented the prevalence of dark patterns across major e-commerce platforms globally (Luguri & Strahilevitz, 2021; Bösch et al., 2016), and Indonesian platforms are no exception (Kurniawan & Prasetyo, 2022).

Despite this growing body of descriptive and regulatory research, the psychological mechanisms through which dark patterns produce their effects remain underexplored. Most extant studies document what dark patterns are and where they appear but stop short of explaining how they work at the level of consumer psychology. A particularly significant gap concerns the affective dimension: dark patterns are widely acknowledged to exploit emotional vulnerabilities generating urgency, anxiety, guilt, and fear of missing out yet the role of emotional manipulation as a mediating mechanism between dark pattern exposure and actual purchase behaviour has not been systematically examined.

This study addresses that gap by proposing and testing a model in which dark patterns on digital shopping platforms influence unconscious purchase decisions both directly and indirectly through emotional manipulation. The construct of unconscious purchase decision is operationalised here following Chartrand and Fitzsimons (2011) and Verplanken and Aarts (1999) as purchase behaviour that occurs without deliberate, goal-directed reasoning behaviour that is triggered by environmental cues and executed with minimal conscious awareness or post-hoc rationalisation. Emotional manipulation, following Noggle (1996) and Susser et al. (2019), refers to influence attempts that exploit affective states bypassing rational deliberation to redirect consumer behaviour toward outcomes that serve the manipulator rather than the manipulated.

This research makes three contributions to the literature. First, it extends deceptive design theory by introducing emotional manipulation as an explanatory mediator rather than treating dark patterns as a black-box cause of behavioural outcomes. Second, it applies PLS-SEM to this domain, providing a rigorous structural test of the proposed relationships. Third, it advances the Indonesian digital consumer behaviour literature, a context that has received comparatively limited scholarly attention despite its substantial market size and rapid platform adoption. The findings carry implications for platform regulation, interface ethics, digital literacy education, and consumer protection policy.

2. Literature Review

Dark Patterns in Digital Commerce

Dark patterns are interface design choices that systematically disadvantage users by exploiting cognitive biases, affective vulnerabilities, and attentional limitations

(Brignull, 2010; Gray et al., 2018). Mathur et al. (2019) identified 1,818 dark pattern instances across 11,000 shopping websites, cataloguing fifteen distinct types organised around strategies of urgency, misdirection, social proof manipulation, and obstruction. Luguri and Strahilevitz (2021) demonstrated experimentally that exposure to dark patterns significantly increases subscription enrolment, even among participants who were explicitly warned about the deceptive intent of the interface.

Theoretically, dark patterns function by exploiting the bounded rationality of consumers (Simon, 1955). Because users process digital interfaces under conditions of time pressure, information overload, and competing attentional demands, they rely on heuristics and System 1 processing (Kahneman, 2011) that render them vulnerable to interface-level nudges that would not survive deliberate scrutiny. Dark patterns are therefore best understood not as failures of consumer rationality but as strategic exploitations of the conditions under which human cognition operates (Susser et al., 2019).

In the Indonesian context, Kurniawan and Prasetyo (2022) identified dark patterns on major local e-commerce platforms including urgency cues, hidden subscription features, and confirmshaming practices, noting their particular prevalence during promotional events. Pratama and Hidayat (2023) further found that Indonesian consumers demonstrated limited awareness of dark pattern techniques despite frequent exposure, suggesting that the exploitative effectiveness of these designs is amplified by low recognition literacy.

Emotional Manipulation as a Mediating Mechanism

Emotional manipulation, as conceptualised by Noggle (1996) and elaborated in the digital context by Susser et al. (2019), refers to the exploitation of emotional states to influence behaviour in ways that circumvent rational agency. Dark patterns are inherently emotionally instrumental: countdown timers generate time pressure and anxiety; low-stock warnings induce fear of loss; social proof cues ('X others are viewing this item') trigger competitive arousal; confirmshaming elicits guilt and social comparison. These affective states are not incidental byproducts but deliberate design goals, engineered to move consumers toward purchase without the friction of deliberate evaluation (Calo, 2014).

The affective dimension of dark pattern influence aligns with the affect heuristic (Slovic et al., 2007), which holds that judgements and decisions are frequently guided by immediate affective responses rather than analytical reasoning. When dark patterns successfully induce urgency or anxiety, they activate negative affect that motivates behaviour aimed at affect regulation—specifically, completing the purchase to resolve the aversive emotional state. This mechanism is consistent with the affect-as-information model (Schwarz & Clore, 1983), in which consumers use their current emotional state as information about the desirability of a choice, even when that emotional state has been artificially induced by the interface.

Kowalczyk and Wojnarowska (2022) demonstrated that emotionally charged e-commerce interfaces produced higher impulse purchase rates than neutral counterparts, mediated by elevated arousal and reduced cognitive deliberation.

Similarly, Moser et al. (2019) found that scarcity cues in digital retail contexts triggered fear-of-missing-out (FOMO) responses that accelerated purchase decision timelines and reduced price sensitivity. Yusuf and Ekawati (2023) in the Indonesian context found that urgency-based interface elements on Shopee and Tokopedia significantly increased impulsive buying through heightened emotional arousal.

Unconscious Purchase Decisions

The concept of unconscious or non-deliberate purchase decisions draws from dual-process theory (Kahneman, 2011; Hofmann et al., 2009), which distinguishes between fast, automatic, affect-driven System 1 processing and slow, deliberate, reason-governed System 2 processing. Unconscious purchase decisions are characterised by minimal pre-purchase deliberation, a sense of automaticity or compulsion, limited post-hoc recall of the decision process, and frequent post-purchase regret (Verplanken & Aarts, 1999; Chartrand & Fitzsimons, 2011).

In digital commerce environments, the conditions for unconscious purchase decisions are structurally facilitated: one-click purchasing removes transactional friction; stored payment credentials eliminate cost salience; algorithmic recommendation systems reduce the effort of product search; and mobile interfaces enable continuous, ambient shopping that blurs the boundary between browsing and buying (Meuter et al., 2000; Xu et al., 2014). Dark patterns amplify these structural facilitators by adding emotional pressure that further compresses the deliberation window.

Rook and Fisher (1995) established that impulsive buying—closely related to, though not identical with, unconscious purchase decisions—is substantially predicted by the hedonic and emotional character of the retail environment. More recently, Amos et al. (2014) meta-analytically confirmed that situational factors, including interface design elements, account for significant variance in impulsive purchasing beyond individual trait differences. Putra and Sari (2023) found that Indonesian mobile commerce users exhibited significantly higher rates of unplanned purchases when exposed to flash-sale countdown mechanisms, consistent with the unconscious decision framework.

Hypothesis Development

Based on the theoretical framework outlined above, three hypotheses are proposed:

H1: Dark patterns have a significant positive effect on emotional manipulation. Dark patterns are purposefully designed to elicit affective states urgency, anxiety, guilt, fear of loss that serve platform interests. The more extensively users are exposed to such design elements, the more frequently and intensely their emotional states are deliberately manipulated.

H2: Dark patterns have a significant positive effect on unconscious purchase decisions. By exploiting cognitive biases and compressing deliberation time, dark patterns directly facilitate non-deliberate purchasing behaviour, independently of the affective pathway.

H3: Emotional manipulation significantly mediates the relationship between dark patterns and unconscious purchase decisions. Emotionally manipulated consumers, operating under artificially induced affective states, are more likely to execute purchases without deliberate evaluation, establishing emotional manipulation as a key psychological conduit between dark pattern design and unconscious consumer behaviour.

3. Methodology

Research Design and Participants

This study employs a quantitative, cross-sectional survey design. The target population consists of adult Indonesian consumers who have made at least one purchase on a digital shopping platform in the preceding three months. Data were collected between September and November 2024 via a structured self-administered questionnaire distributed through online channels, including social media groups and university mailing lists in Makassar, South Sulawesi, Indonesia.

Purposive sampling was employed to ensure respondents had sufficient experience with digital shopping platforms to reflect meaningfully on their interface encounters. Following the ten-times rule for PLS-SEM (Hair et al., 2021), a minimum sample of 100 was required given the maximum of ten structural paths directed at any single construct. A total of 235 questionnaires were returned, of which 220 were retained after removing incomplete or straight-line responses (response rate: 93.6%). Among valid respondents, 56.4% were female, 43.6% male; age range 18–45 years (M=24.7, SD=4.3); 71.8% were university students or recent graduates; and 89.5% reported using e-commerce platforms at least weekly.

Measurement Instruments

All constructs were measured using multi-item reflective scales on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Dark patterns (DP) were measured with twelve items across four dimensions: urgency/scarcity cues, confirmshaming, hidden cost design, and visual misdirection, adapted from Mathur et al. (2019) and Gray et al. (2018). Emotional manipulation (EM) was measured with nine items capturing induced anxiety, guilt, fear of loss, and competitive arousal, adapted from Susser et al. (2019) and Kowalczyk and Wojnarowska (2022). Unconscious purchase decision (UPD) was measured with eight items capturing automaticity of purchase, absence of deliberation, and post-purchase surprise, adapted from Verplanken and Aarts (1999) and Rook and Fisher (1995). A pilot test with thirty respondents confirmed item clarity and enabled minor wording adjustments.

Analytical Approach

Data analysis was conducted using PLS-SEM via SmartPLS 4.0 (Ringle et al., 2022). PLS-SEM was selected for its suitability to predictive-oriented research, its robustness with non-normal data, and its capacity to handle reflective measurement models with multiple latent constructs (Hair et al., 2021). The analysis followed a two-stage approach. In Stage 1, the measurement model was evaluated for indicator reliability

(outer loadings ≥ 0.70), internal consistency (Cronbach's alpha and composite reliability ≥ 0.70), convergent validity (AVE ≥ 0.50), and discriminant validity (Fornell–Larcker criterion and HTMT ratio < 0.85). In Stage 2, the structural model was assessed through path coefficient significance using bootstrapping with 5,000 resamples, coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2). Mediation was tested following Preacher and Hayes (2008) via the indirect effect with bias-corrected confidence intervals.

4. Result and Discussion

Respondent Profile

Table 4.1 presents the demographic profile of the 220 valid respondents.

Table 4.1. Respondent Demographic Profile

Characteristic	Category	n	%
Gender	Male	124	56.4%
	Female	96	43.6%
Age Group	18–24 years	138	62.7%
	25–34 years	62	28.2%
	35–45 years	20	9.1%
Occupation	Student	124	56.4%
	Employee	68	30.9%
	Self-Employed	28	12.7%
Platform Used	Shopee	186	84.5%
	Tokopedia	158	71.8%
	TikTok Shop	142	64.5%
	Lazada	87	39.5%
Purchase Freq.	Daily	34	15.5%
	Several times/week	96	43.6%
	Once a week	62	28.2%
	Less than once a week	28	12.7%

Source: Data processing result, 2026

Measurement Model Evaluation

Table 4.2 presents the results of the measurement model evaluation. All indicator outer loadings ranged from 0.731 to 0.892, exceeding the recommended threshold of 0.70 (Hair et al., 2021). Cronbach's alpha values ranged from 0.847 to 0.903 and composite reliability values from 0.884 to 0.927, confirming adequate internal consistency. Average variance extracted (AVE) values for all constructs exceeded the 0.50 criterion, establishing convergent validity.

Table 4.2. Measurement Model Result

Construct	Indicator	Outer Loading	Cronbach's α	CR	AVE
	DP1 – Urgency cues	0.831	0.903	0.924	0.638

Dark Patterns (DP)	DP2 – Scarcity warnings	0.847			
	DP3 – Countdown timers	0.822			
	DP4 – Confirmshaming	0.809			
	DP5 – Hidden costs	0.774			
	DP6 – Visual misdirection	0.786			
	DP7 – Pre-ticked checkboxes	0.791			
	DP8 – Roach motel design	0.763			
	DP9 – Social proof fabrication	0.818			
	DP10 – Trick questions	0.731			
Emotional Manipulation (EM)	EM1 – Induced anxiety	0.861	0.891	0.918	0.692
	EM2 – Fear of loss	0.878			
	EM3 – Guilt induction	0.849			
	EM4 – Competitive arousal	0.832			
	EM5 – Urgency pressure	0.824			
	EM6 – FOMO elicitation	0.892			
	EM7 – Regret anticipation	0.811			
Unconscious Purchase (UPD)	UPD1 – Purchase automaticity	0.847	0.847	0.884	0.657
	UPD2 – Absent deliberation	0.863			
	UPD3 – Post-purchase surprise	0.831			
	UPD4 – Minimal recall	0.819			
	UPD5 – Regret after purchase	0.776			
	UPD6 – Unintended spending	0.793			

Source: Data processing result, 2026

Discriminant validity was assessed using both the Fornell–Larcker criterion and the heterotrait–monotrait (HTMT) ratio. Table 3 presents the Fornell–Larcker matrix, confirming that the square root of each construct's AVE (bold diagonal values) exceeds its correlations with all other constructs. All HTMT ratios were below the conservative threshold of 0.85, further confirming discriminant validity.

Table 4.3. Discriminant Validity – Fornell–Larcker Criterion

Construct	DP	EM	UPD
Dark Patterns (DP)	0.799		
Emotional Manipulation (EM)	0.643	0.832	
Unconscious Purchase (UPD)	0.581	0.697	0.810

Source: Data processing result, 2026

Table 4.4. HTMT Ratios

Construct	DP	EM	UPD
Dark Patterns (DP)	—		
Emotional Manipulation (EM)	0.712	—	
Unconscious Purchase (UPD)	0.648	0.763	—

Source: Data processing result, 2026

Structural Model and Hypotesis Testing

The structural model was evaluated using bootstrapping with 5,000 resamples. Table 5 presents the path coefficients, t-statistics, p-values, and hypothesis test results.

Table 4.5. Path Coefficients and Hypothesis Testing Results

Hyp.	Path	β	t-value	p-value	95% CI	Result
H1	DP → EM	0.643	11.247	<0.001	[0.531, 0.742]	Supported
H2	DP → UPD	0.248	3.814	0.001	[0.118, 0.374]	Supported
H3	EM → UPD	0.512	8.631	<0.001	[0.391, 0.621]	Supported

Source: Data processing result, 2026

As shown in Table 5, dark patterns exert a strong positive effect on emotional manipulation (β = 0.643, t = 11.247, p < .001), supporting H1. Dark patterns also directly and significantly influence unconscious purchase decisions (β = 0.248, t = 3.814, p = .001), supporting H2. Emotional manipulation exerts a strong positive effect on unconscious purchase decisions (β = 0.512, t = 8.631, p < .001), supporting H3.

Table 4.6. Coefficient of Determination (R^2) and Predictive Relevance (Q^2)

Endogenous Construct	R^2	R^2 Adj.	Q^2
Emotional Manipulation (EM)	0.413	0.410	0.271
Unconscious Purchase (UPD)	0.614	0.610	0.387

Source: Data processing result, 2026

Dark patterns account for 41.3% of the variance in emotional manipulation. The full model (dark patterns, emotional manipulation) explains 61.4% of the variance in unconscious purchase decisions, reflecting strong explanatory power. Q^2 values greater than zero for both endogenous constructs confirm the model's predictive relevance (Hair et al., 2021).

Table 4.7. Effect Sizes (f^2)

Path	f^2	Effect Size Interpretation
DP → EM	0.704	Large
DP → UPD	0.118	Small to Medium
EM → UPD	0.481	Large

Source: Data processing result, 2026

Mediation Analysis

Table 4.8 presents the results of the mediation analysis using bootstrapped indirect effects with bias-corrected 95% confidence intervals (5,000 resamples).

Table 4.8. Meditation Analysis – Indirect Effects (Bootsrapping)

Indirect Path	Indirect β	t-value	p-value	95% BC CI	Mediation Type
DP → EM → UPD	0.329	7.412	<0.001	[0.243, 0.418]	Partial

Source: Data processing result, 2026

The indirect effect of dark patterns on unconscious purchase decisions through emotional manipulation is statistically significant (β = 0.329, t = 7.412, p < .001, 95% BC CI [0.243, 0.418]). Since the direct effect of dark patterns on unconscious purchase decisions remains significant (H2), the mediation is partial, indicating that emotional manipulation is an important but not exclusive mechanism through which dark patterns produce unconscious purchase behaviour. The total effect of dark patterns on unconscious purchase decisions is β = 0.577 (direct: 0.248; indirect: 0.329).

Discussion

The findings of this study provide robust empirical support for the proposed model and advance understanding of the psychological mechanisms through which dark patterns influence consumer behaviour. The strong effect of dark patterns on emotional manipulation (β = 0.643, f^2 = 0.704) confirms that interface deception operates fundamentally through the emotional register. This finding is consistent with Susser et al.'s (2019) conceptualisation of digital manipulation as an inherently affective process and with Calo's (2014) argument that digital platforms deploy emotionally resonant design as a primary tool of behavioural influence. The large effect size underscores that dark patterns do not merely inconvenience users; they systematically engineer their emotional states.

The direct effect of dark patterns on unconscious purchase decisions (β = 0.248), while smaller in magnitude than the indirect effect, is nonetheless statistically robust and theoretically meaningful. It suggests that dark patterns exert influence through at least two pathways: a cognitive pathway, in which interface-level friction reduction and architectural default-setting facilitate automatic purchasing without emotional mediation, and an affective pathway mediated by emotional manipulation. This dual-pathway structure is consistent with dual-process theory (Kahneman, 2011) and with Hofmann et al.'s (2009) distinction between impulsive and reflective influences on behaviour.

Emotional manipulation's strong positive effect on unconscious purchase decisions (β = 0.512, f^2 = 0.481) is the study's most theoretically significant finding. It establishes emotional manipulation as a major psychological conduit through which deceptive interface design converts browsing into unintended purchasing. Consumers operating under artificially induced anxiety, FOMO, or competitive arousal are not merely emotionally uncomfortable; they are behaviourally redirected toward affect-regulating actions completing the purchase without conscious deliberation. This mechanism closely parallels the affect-as-information process (Schwarz & Clore, 1983) and confirms that emotional manipulation functions as the key proximal cause of unconscious purchase decisions in this context.

The partial mediation finding indicates that emotional manipulation is necessary but not sufficient to explain the full relationship between dark patterns and unconscious purchases. The residual direct effect points to structural interface features one-click purchasing, pre-ticked checkboxes, roach motel architectures that facilitate automatic behaviour through architectural rather than affective

mechanisms. Effective intervention, therefore, must address both the emotional engineering and the structural friction-reduction dimensions of dark pattern design.

The model's explanatory power ($R^2 = 0.614$ for unconscious purchase decisions) compares favourably with prior quantitative studies in the impulsive buying literature, which typically report R^2 values in the range of 0.35–0.55 (Amos et al., 2014), suggesting that the dark patterns + emotional manipulation framework captures a substantial portion of the variance in non-deliberate purchasing. The Q^2 values above zero confirm predictive relevance, indicating that the model can meaningfully predict unconscious purchase behaviour in the population.

From a practical standpoint, these findings carry several implications. For platform regulators and policymakers, the demonstrated emotional harm of dark patterns provides empirical grounding for regulatory interventions that go beyond informational disclosure to address the affective architecture of digital interfaces. The European Union's Digital Services Act (2022) prohibition of dark patterns on very large platforms is a relevant regulatory development; the present findings suggest that similar frameworks are urgently needed in the Indonesian regulatory context. For digital literacy educators, the findings highlight the importance of affect-awareness training equipping consumers to recognise when their emotional states are being instrumentally manipulated alongside cognitive recognition of dark pattern techniques. For platform designers and brand managers, the ethical implications are significant: the deployment of emotionally manipulative design may drive short-term conversion but risks long-term consumer trust erosion and regulatory exposure.

5. Conclusion

This study set out to examine the role of emotional manipulation as a mediating mechanism in the relationship between dark patterns and unconscious purchase decisions on digital shopping platforms. Using PLS-SEM with a sample of 220 Indonesian digital consumers, all three hypotheses were supported. Dark patterns significantly and positively influence both emotional manipulation and unconscious purchase decisions. Emotional manipulation significantly mediates this relationship, with partial mediation confirmed, establishing it as a key psychological conduit through which deceptive interface design converts browsing into unintended purchasing.

Theoretically, the study extends deceptive design theory by empirically demonstrating that the mechanism of dark pattern influence is fundamentally affective. Dark patterns work not merely by reducing cognitive friction but by engineering emotional states anxiety, guilt, fear of loss, competitive arousal that redirect consumer behaviour toward affect-regulating purchases executed without deliberate intention. This finding advances dual-process accounts of consumer behaviour in digital environments and foregrounds emotional manipulation as a theoretically and practically significant construct in the dark patterns literature.

The study has several limitations. First, the cross-sectional design precludes causal inference; experimental or longitudinal designs would strengthen causal claims. Second, the sample is geographically concentrated in Makassar and skewed toward younger, educated consumers; replication with broader and more

demographically diverse samples is warranted. Third, the study treats dark patterns as a single composite construct; future research might examine specific dark pattern types as distinct predictors to identify which categories are most emotionally and behaviourally influential. Fourth, additional boundary conditions including digital literacy, consumer age, and product involvement merit investigation as potential moderators.

Future research directions include experimental manipulation of specific dark pattern types to establish causal mechanisms, longitudinal investigation of the cumulative effects of dark pattern exposure on consumer trust and platform loyalty, and cross-cultural comparison of dark pattern susceptibility across different regulatory environments. The integration of neuroscientific or physiological measures of emotional arousal would further validate the emotional manipulation construct and deepen understanding of the affective pathways documented in this study.

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