INTERNATIONAL JOURNAL OF SOCIAL SCIENCE, EDUCATIONAL, ECONOMICS, AGRICULTURE RESEARCH AND TECHNOLOGY (IJSET) | ISSN (E): 2827-766X
Website: https://ijset.org/ | Volume 5 No. 9 (2026)

CELEBRITY ENDORSEMENT, BLIND-BOX GAMIFICATION, AND SCARCITY CUES AS STIMULI OF CONSUMER BEHAVIOUR: A STUDY OF POP MART'S ECOSYSTEM IN INDONESIA

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Received: 01/07/2026 | **Revised:**11/07/2026 | **Accepted:**27/07/2026 | **Published:** 10/08/2026

Abstract

Pop Mart's blind-box retail model has driven rapid growth across Southeast Asia, including Indonesia, by engineering scarcity, gamification, and celebrity endorsement into every transaction. While these tactics generate immediate commercial success, their long-term implications for consumer well-being, brand trust, and market sustainability remain underexplored. Drawing on the Stimulus–Organism–Response (S–O–R) framework, this study examines the psychological mechanisms through which celebrity endorsement, blind-box gamification, and scarcity cues affect impulse buying and repeat-purchase intentions among Indonesian consumers, mediated by parasocial attachment, perceived enjoyment, and emotional arousal. A quantitative, cross-sectional design was employed, collecting data from 229 Indonesian consumers aged 18–40 via online questionnaire. Partial Least Squares Structural Equation Modelling (PLS-SEM) with 5,000 bootstrap resamples was used to test thirteen direct and six mediation hypotheses. Results reveal that each stimulus activates a distinct psychological pathway: gamification drives hedonic enjoyment and sustainable repeat purchase; scarcity cues generate pressure-based emotional arousal that triggers compulsive buying; and celebrity endorsement, counter-intuitively, suppresses both enjoyment and long-term repurchase through expectation-disconfirmation in the probabilistic reveal format. The study extends the S–O–R model to physical collectable retail and provides actionable governance recommendations for ethical scarcity architectures in ASEAN markets.

Keywords: blind-box gamification, consumer behaviour, fear of missing out, parasocial attachment, scarcity cues.

INTRODUCTION

The digital economy has reshaped consumer behaviour worldwide as social media, entertainment, and mobile shopping converge into a single consumption experience. Indonesia leads Southeast Asia in digital gross merchandise value (Google & Bain & Company, 2023), with its e-commerce market projected to reach USD 90.35 billion by 2025 and USD 185.71 billion by 2030 (Mordor Intelligence, 2025). Alongside this growth, the global collectable toy and blind-box industry has expanded sharply, from USD 16.68 billion in 2024 to a projected USD 40 billion by 2032 (Business Research Insights, 2025). Pop Mart International Group Limited is the category leader: each blind box contains a randomly assigned figurine, with rare 'secret' editions carrying odds as low as 1:144 – the same variable-ratio reinforcement schedule used in slot machines and mobile-game loot boxes, reliably producing curiosity, anticipation, and fear of missing out (FOMO).

Within the Stimulus-Organism-Response (S-O-R) paradigm (Mehrabian & Russell, 1974), the blind box functions as a stimulus generating internal states such as excitement, tension, and urgency that drive impulse buying and repeat purchase. Gamified features have been shown to significantly increase perceived enjoyment and impulse-buying tendencies (Gao & Zhao, 2023) and to activate internal states that shape purchase intention among impulsive buyers (Kadir et al., 2024); in Indonesia specifically, gamification increases engagement and repurchase intention (Suratmanto et al., 2025), and sales promotion and product knowledge drive impulsive online purchasing (Al Mutanafisa & Retnaningsih, 2021). These dynamics are amplified by Indonesia's large Gen Z population and deeply rooted K-pop fandom culture – overseas K-pop sales exceeded one trillion won for the first time in 2023 (Kim, 2024; Yoon & Lee, 2024) – and Indonesian studies confirm that perceived scarcity and FOMO are potent drivers of

impulsive spending in fan segments exposed to parasocial, celebrity-driven marketing (Martiza & Hadi, 2025). Pop Mart entered Indonesia in 2023 with a hyper-localised, omnichannel strategy – premium stores, automated 'Robo Shop' vending machines, and product drops timed to TikTok and Instagram fandom trends – driving 2024 revenue of RMB 13.04 billion (up 106.9% year on year) and first-half 2025 revenue of RMB 13.88 billion (Pop Mart International Group Limited, 2025a, 2025b). Yet the same mechanisms that fuel this growth – engineered scarcity, gamified uncertainty, and celebrity association – are also implicated in impulse buying, emotional strain, and overconsumption (Gong et al., 2024; Rofiah & Arrahima, 2025). This tension between short-term commercial engagement and long-term consumer and brand sustainability is the business problem addressed here: it remains unclear whether celebrity endorsement, gamification, and scarcity cues operate through the same or different psychological pathways, and whether they contribute equally to sustainable repeat purchasing rather than merely short-lived impulsive spending. Building on the S-O-R paradigm together with Parasocial Interaction Theory, Celebrity Endorsement Theory, Gamification Theory, and Scarcity/FOMO Theory, this study proposes that celebrity endorsement, blind-box gamification, and scarcity cues function as distinct marketing stimuli activating three organism states – parasocial attachment, perceived enjoyment, and emotional arousal/FOMO – which in turn shape impulse buying and repeat purchase. The research question is: how do celebrity endorsement, blind-box gamification, and scarcity cues influence consumer behaviour in Pop Mart's blind-box ecosystem through these psychological organism states? Thirteen structural hypotheses (H1–H13, Section 2.2) operationalise this question and are tested using PLS-SEM on survey data from 229 Indonesian consumers.

LITERATURE REVIEW

2.1 Theoretical Foundation

Stimulus-Organism-Response (S-O-R) Theory. Mehrabian and Russell (1974) introduced the S-O-R model to explain how environmental cues shape emotional states and, subsequently, behavioural responses. Initially applied to physical retail atmospherics, the model has since been extended to online interfaces, social media, and gamified commerce (Donovan & Rossiter, 1982; Eroglu et al., 2001), with contemporary research treating promotional messages, interaction mechanics, social proof, and celebrity cues as stimuli in their own right and the organism component expanded to include perceived enjoyment, parasocial attachment, and FOMO (Aw & Labrecque, 2020; Zhang et al., 2022). In this study, celebrity endorsement, blind-box gamification, and scarcity cues are treated as stimuli; parasocial attachment, perceived enjoyment, and emotional arousal/FOMO as organism states; and impulse buying and repeat purchase as behavioural responses.

Parasocial Interaction Theory and Celebrity Endorsement Theory. Horton and Wohl (1956) first described how audiences form one-sided, emotionally meaningful relationships with media personalities, a process intensified by social media as celebrities share more personal content, heightening perceived intimacy and driving higher purchase intention and endorsement responsiveness (Aw & Labrecque, 2020; Gong et al., 2024). This builds on source credibility theory, which holds that trustworthy, expert communicators are more persuasive (Hovland & Weiss, 1951), on McGuire's (1985) emphasis on endorser attractiveness, and on McCracken's (1989) argument that celebrities transfer culturally constructed meaning to endorsed brands. At Pop Mart, celebrity endorsement occurs through both formal collaborations and organic appearances of Pop Mart figures in celebrity content, positioning it as a stimulus that may activate parasocial attachment and perceived enjoyment.

Gamification Theory. Gamification denotes the use of game-design elements in non-game contexts to increase engagement and motivation (Deterding et al., 2011). In digital commerce, gamified mechanics – uncertainty, reward structures, and collection systems – increase perceived enjoyment and impulse buying (Gao & Zhao, 2023) and have been linked to repurchase intention in Indonesian e-commerce (Suratmanto et al., 2025). Blind-box unboxing is itself a gamified act: the randomised reveal, pursuit of rare secret editions, and variable-ratio reward schedule combine to generate a hedonically rewarding experience consistent with Self-Determination Theory's account of intrinsic motivation (Deci & Ryan, 1985).

Scarcity and FOMO Theory. Commodity theory holds that restricted availability increases perceived value (Brock, 1968; Lynn, 1991), and scarcity cues – limited editions, countdowns, visible popularity – heighten emotional arousal and impulse buying (Zhang et al., 2022). FOMO, the anxious apprehension that others are having rewarding experiences one is missing (Przybylski et al., 2013), has been linked directly to impulsive purchasing of K-pop and blind-box merchandise among Indonesian fans (Martiza & Hadi, 2025; Rofiah & Arrahima, 2025), making scarcity and FOMO mechanisms especially potent for collectable products built around rarity and completing a set.

Impulse Buying and Repeat Purchase Behaviour. Impulse buying is a spontaneous, unplanned purchase driven by an immediate urge (Rook, 1987) and an established outcome of emotional and hedonic stimulation (Oliver, 1980);

sales promotion, product knowledge, and TikTok-based marketing have all been shown to predict impulsive online buying in Indonesia (Al Mutanafisa & Retnaningsih, 2021; Meliawati et al., 2023). Repeat purchase, by contrast, reflects a more deliberate, reinforcement-based process in which satisfaction and enjoyment sustain long-term engagement (Oliver, 1999). This study integrates both outcomes to capture the full behavioural cycle that Pop Mart's blind-box ecosystem is designed to produce.

2.2 Relationship between Marketing Stimuli, Organism States, and Behavioural Responses

Prior research indicates that emotionally charged environments, social stimuli, and gamified purchasing mechanics trigger specific emotional and relational responses that ultimately shape consumption (Aw & Labrecque, 2020; Gao & Zhao, 2023; Gong et al., 2024; Zhang et al., 2022). Building on this literature, celebrity endorsement is expected to activate parasocial attachment, perceived enjoyment, and emotional arousal/FOMO through symbolic identification with endorsers; blind-box gamification is expected to promote enjoyment and arousal through uncertainty and collection structure; and scarcity cues, through limited-edition releases, are expected to heighten arousal and, to a lesser extent, enjoyment. At the organism-response stage, parasocial attachment, perceived enjoyment, and emotional arousal/FOMO are each expected to drive impulse buying and repeat purchase, consistent with S-O-R logic in which stimuli rarely affect behaviour directly but instead operate through mediating emotional and relational states.

On this basis, the following thirteen hypotheses were developed and tested:

H1: Celebrity endorsement positively affects parasocial attachment.
H2: Celebrity endorsement positively affects perceived enjoyment.
H3: Celebrity endorsement positively affects emotional arousal/FOMO.
H4: Blind-box gamification positively affects perceived enjoyment.
H5: Blind-box gamification positively affects emotional arousal/FOMO.
H6: Scarcity cues positively affect perceived enjoyment.
H7: Scarcity cues positively affect emotional arousal/FOMO.
H8: Parasocial attachment positively affects impulse buying.
H9: Perceived enjoyment positively affects impulse buying.
H10: Emotional arousal/FOMO positively affects impulse buying.
H11: Parasocial attachment positively affects repeat purchase.
H12: Perceived enjoyment positively affects repeat purchase.
H13: Emotional arousal/FOMO positively affects repeat purchase.

2.3 Conceptual Framework

This study draws on theoretical and empirical evidence to position celebrity endorsement, blind-box gamification, and scarcity cues as external stimuli that shape internal psychological states, namely parasocial attachment, perceived enjoyment, and emotional arousal/FOMO, which in turn are hypothesised to determine impulse buying and repeat purchase intention. The conceptual model therefore examines three sets of relationships: how the three stimuli influence the three organism states, how the organism states shape the two behavioural responses, and the mediating pathways connecting stimuli to responses through these internal states. The conceptual framework is illustrated in Image 1.

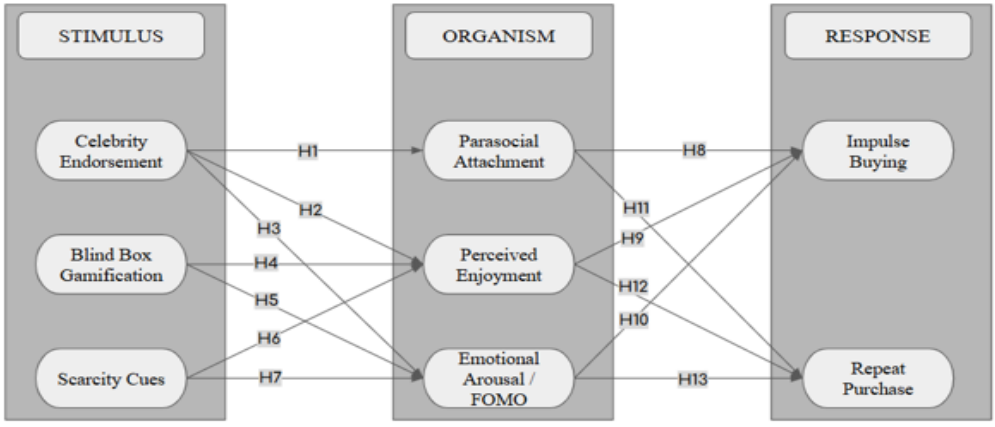

Image 1. S–O–R Conceptual Framework (Author, 2026)

METHOD

3.1 Research Design

This study used a quantitative, explanatory, cross-sectional design to examine the relationships among eight latent constructs: celebrity endorsement, blind-box gamification, scarcity cues, parasocial attachment, perceived enjoyment, emotional arousal/FOMO, impulse buying, and repeat purchase, consistent with common practice in behavioural marketing research relying on structural model testing and mediation analysis (Hair et al., 2022). Data were collected online from Indonesian consumers aged 18–40 who had purchased or engaged with Pop Mart blind-box products, or had been exposed to related marketing strategies such as celebrity endorsement, scarcity promotions, or gamified purchasing mechanics.

3.2 Sampling

A non-probability purposive sampling technique targeted Indonesian consumers aged 18–40 who were Pop Mart collectors, occasional or first-time blind-box buyers, or consumers exposed to Pop Mart celebrity or influencer content. Minimum sample size, following Cohen's (1992) power framework as adapted by Hair et al. (2022) for three predictor paths, $\alpha = 0.05$, power = 0.80, and $f^2 = 0.15$, was 77 respondents, independently confirmed with G*Power 3.1 (Faul et al., 1996). The final sample substantially exceeded this threshold: 229 valid responses were collected and analysed, all meeting the study's screening criteria.

3.3 Measurement

All eight latent constructs were measured using multi-item, five-point Likert scales (1 = "strongly disagree" to 5 = "strongly agree"), with items adapted from established parasocial, endorsement, gamification, and scarcity research (Aw & Labrecque, 2020; Gao & Zhao, 2023; Zhang et al., 2022; Suratmanto et al., 2025). Table 1 summarises the operational definitions, indicators, and sources for each construct.

Table 1. Measurement of variables (Author, 2026)

Variable	Operational Definition	Indicators (4 items each)	Source
Celebrity Endorsement (CE)	Perceived endorser credibility, attractiveness, and product fit	Credibility; product knowledge; brand fit; attractiveness	Aw & Labrecque (2020); Gong et al. (2024)
Blind-Box Gamification (GB)	Engagement and fun from game-like blind-box mechanics	Excitement from uncertainty; enjoyment of surprise; rarity motivation; game-like experience	Gao & Zhao (2023)
Scarcity Cues (SC)	Perceived limited supply, exclusivity, and urgency	Limited availability; value of limited editions; purchase pressure; popularity-driven urgency	Zhang et al. (2022)
Parasocial Attachment (PA)	Emotional closeness toward a celebrity/endorser	Familiarity; preference influence; attention to content; sense of connection	Aw & Labrecque (2020)
Perceived Enjoyment (PE)	Hedonic pleasure from purchasing/unboxing	Enjoyment of unboxing; excitement of reveal; entertainment value; positive affect	Gao & Zhao (2023)
Emotional Arousal/FOMO (EA)	Urgency and fear of missing out from limited releases	Urgency to purchase; anxiety about missing out; excitement/tension; concern over unavailability	Zhang et al. (2022)
Impulse Buying (IB)	Unplanned purchase triggered by marketing stimuli	Unplanned purchase; sudden urge; no prior intention; difficulty resisting	Rook (1987); Zhang et al. (2022)
Repeat Purchase (RP)	Likelihood of continuing to buy Pop Mart products	Future intention; intent to buy new series; continued engagement; willingness to spend again	Suratmanto et al. (2025)

3.4 Data Collection

Primary data were collected through a structured online questionnaire comprising a screening section (age, blind-box exposure, awareness of celebrity/scarcity marketing), a demographic and behavioural section (age, gender,

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occupation, primary platform, purchase frequency), and a measurement section covering the eight latent constructs. The questionnaire was pilot tested prior to full distribution. Secondary data, including Pop Mart's corporate financial disclosures and industry market reports, were used to contextualise the business setting described in the Introduction.

3.5 Data Analysis

Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS, a variance-based approach suited to predictive, exploratory research with multiple mediators and non-normal Likert-scale data (Hair et al., 2022). Analysis proceeded in four stages: (1) descriptive analysis of demographics and construct statistics; (2) measurement-model evaluation via indicator reliability, internal consistency (Cronbach's alpha, composite reliability), convergent validity (AVE), and discriminant validity (Fornell-Larcker, HTMT); (3) structural-model evaluation via VIF, path coefficients, R^2, and f^2; and (4) hypothesis testing via bootstrapping with 5,000 resamples for the thirteen direct paths (H1–H13), followed by specific indirect-effect testing for six mediation pathways (M1–M6) using Zhao et al.'s (2010) procedure as adapted to PLS-SEM by Hair et al. (2022).

RESULTS AND DISCUSSION

4.1 Respondent Profile

A total of 229 valid responses were obtained from Indonesian consumers exposed to Pop Mart blind-box products. Table 2 summarises the demographic and behavioural profile of the sample.

Table 2. Demographic and behavioural profile of respondents (Author, 2026)

Category	Group	n	%
Age	18–24 years	37	16.2
	25–30 years	59	25.8
	31–35 years	51	22.3
	36–40 years	81	35.4
	Above 40 years	1	0.4
Gender	Female	159	69.4
	Male	70	30.6
Occupation	Private-sector employee	103	45.0
	Student	54	23.6
	Public-sector employee	30	13.1
	Entrepreneur / business owner	22	9.6
	Other	20	8.7
Primary platform	Instagram	118	51.5
	TikTok	66	28.8
	Pop Mart official website	17	7.4
	Online collector communities	11	4.8
	YouTube	9	3.9
	Reddit / offline stores	8	3.4
Purchase frequency (last 3 months)	None	2	0.9
	Once	70	30.6
	Two to three times	112	48.9
	Four to six times	13	5.7
	More than six times	32	14.0

Most respondents fell within productive working-age groups, led by the 36–40 bracket (35.4%), followed by 25–30 (25.8%) and 31–35 (22.3%), indicating that blind-box consumption in Indonesia is embraced substantially by mature, working-age adults rather than only younger consumers. The sample was strongly female-skewed (69.4%), consistent with prior evidence that women are more inclined toward hedonic, emotionally engaged consumption. Private-sector employees formed the largest occupational group (45.0%), followed by students (23.6%), suggesting steady income supports repeated non-essential purchasing alongside a sizeable student segment. Instagram (51.5%) and TikTok (28.8%) were the dominant platforms, reflecting the centrality of short-form social video to unboxing culture and celebrity visibility, while 48.9% of respondents purchased two to three times in the

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past three months and 14.0% more than six times, indicating that frequent, emotion-driven buying is common in this segment.

4.2 Descriptive Statistics of Constructs

Table 3 presents the mean, standard deviation, skewness, and kurtosis for each of the eight constructs, calculated from averaged standardised item scores across the 229 valid responses.

Table 3. Descriptive statistics of all constructs (SmartPLS, 2026)

Construct	Mean	SD	Skewness	Kurtosis
Celebrity Endorsement (CE)	3.412	0.972	-0.641	-0.183
Blind-Box Gamification (GB)	3.892	1.011	-1.024	0.317
Scarcity Cues (SC)	3.618	0.943	-0.502	0.028
Parasocial Attachment (PA)	3.073	1.184	-0.197	-0.702
Perceived Enjoyment (PE)	4.087	0.874	-1.102	0.953
Emotional Arousal (EA)	3.174	1.123	-0.388	-0.521
Impulse Buying (IB)	3.187	1.118	-0.341	-0.591
Repeat Purchase (RP)	3.673	0.981	-0.715	0.142

Perceived enjoyment recorded the highest mean (M = 4.087, SD = 0.874), indicating that blind-box consumption is primarily experienced as pleasurable rather than merely acquisitive, consistent with experiential consumption theory (Holbrook & Hirschman, 1982). Gamification followed (M = 3.892, skewness = -1.024), indicating that recognition of game-like mechanics was broadly shared rather than confined to a subset of enthusiasts. Scarcity cues (M = 3.618) showed a near-symmetric distribution (kurtosis = 0.028), and repeat purchase intention was comparatively high (M = 3.673), consistent with Pop Mart's own commercial data showing a member repeat-purchase rate exceeding 50% in its primary market. Parasocial attachment recorded both the lowest mean (M = 3.073) and highest SD (1.184), indicating that emotional bonds with celebrity endorsers are the least common and most variable state in the model (Aw & Labrecque, 2020; Horton & Wohl, 1956). All constructs exhibited negative skewness, typical of hedonic product categories in which responses cluster toward agreement.

4.3 Measurement Model Evaluation

The measurement model was evaluated for internal consistency, convergent validity, and discriminant validity. All eight constructs achieved Cronbach's alpha and composite reliability values above the 0.70 threshold, with Repeat Purchase showing the highest internal consistency (α = 0.958, ρc = 0.969) and Average Variance Extracted (AVE) values for all constructs exceeding the 0.50 minimum recommended by Fornell and Larcker (1981) and Hair et al. (2022), confirming adequate convergent validity. Table 4 summarises these results.

Table 4. Construct reliability and validity summary (SmartPLS, 2026)

Construct	Cronbach's α	Composite Reliability (ρc)	AVE
Celebrity Endorsement (CE)	0.847	0.897	0.686
Blind-Box Gamification (GB)	0.879	0.917	0.735
Scarcity Cues (SC)	0.861	0.906	0.708
Parasocial Attachment (PA)	0.902	0.931	0.771
Perceived Enjoyment (PE)	0.868	0.910	0.717
Emotional Arousal (EA)	0.893	0.926	0.759
Impulse Buying (IB)	0.881	0.918	0.737
Repeat Purchase (RP)	0.958	0.969	0.887

Discriminant validity was confirmed via the Fornell-Larcker criterion, where the square root of each construct's AVE exceeded its correlations with all other constructs, and the Heterotrait-Monotrait ratio (HTMT), with all values below the conservative 0.85 threshold (Henseler et al., 2015). Collinearity diagnostics showed inner-model VIF values within acceptable limits (below 5.0) for all structural paths, except two Repeat Purchase indicators (outer VIF of 9.985 and 7.354) that exceeded the conventional threshold, discussed further as a limitation in Section 4.9. Overall, the measurement model demonstrated satisfactory reliability and validity, supporting structural model evaluation.

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4.4 Structural Model Evaluation

The structural model explained a substantial proportion of variance across all five endogenous constructs. Emotional arousal showed the strongest explanatory power ($R^2 = 0.576$), followed by impulse buying ($R^2 = 0.513$), repeat purchase ($R^2 = 0.472$), parasocial attachment ($R^2 = 0.477$), and perceived enjoyment ($R^2 = 0.255$). Following Hair et al. (2022), R^2 values of 0.25, 0.50, and 0.75 are interpreted as weak, moderate, and substantial, respectively; the model therefore demonstrates moderate-to-substantial explanatory power for the behavioural outcomes of central interest. Image 2 presents the full structural model with standardised path coefficients, outer loadings, and R^2 values.

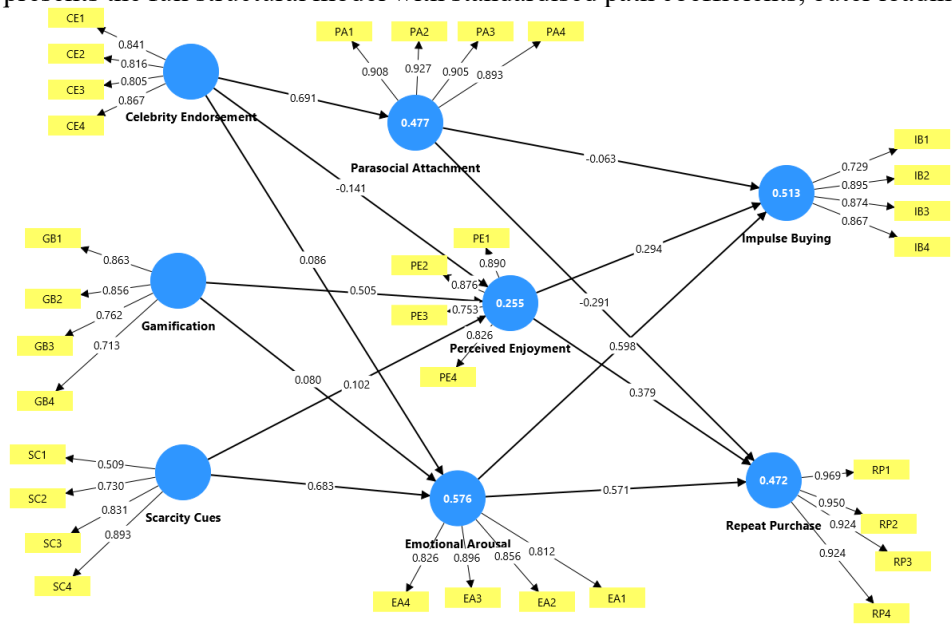

Image 2. PLS-SEM structural model: path coefficients, outer loadings, and R^2 values (SmartPLS, 2026)

4.5 Hypothesis Testing

Thirteen direct hypotheses (H1–H13) were tested using bootstrapping with 5,000 resamples. A hypothesis was considered supported when the bootstrapped p-value was below 0.05 and the 95% bias-corrected confidence interval excluded zero; where a path was statistically significant but opposite in sign to the hypothesised direction, it is classified as 'not supported (negative direction)'. Table 5 presents the complete results.

Table 5. Direct hypothesis testing results (SmartPLS, 2026)

H	Path	β	T-stat	p-value	Decision
H1	CE → PA	0.691	21.379	< .001	Supported
H2	CE → PE	-0.141	2.258	.024	Not supported (negative)
H3	CE → EA	0.086	1.917	.055	Not supported
H4	GB → PE	0.505	6.037	< .001	Supported
H5	GB → EA	0.080	1.564	.118	Not supported
H6	SC → PE	0.102	1.311	.190	Not supported
H7	SC → EA	0.683	17.741	< .001	Supported
H8	PA → IB	-0.063	1.080	.280	Not supported
H9	PE → IB	0.294	6.725	< .001	Supported
H10	EA → IB	0.598	12.883	< .001	Supported
H11	PA → RP	-0.291	4.805	< .001	Not supported (negative)
H12	PE → RP	0.379	7.095	< .001	Supported
H13	EA → RP	0.571	9.276	< .001	Supported

Seven of the thirteen hypotheses (H1, H4, H7, H9, H10, H12, H13) were supported in the hypothesised positive direction. Two hypotheses (H2 and H11) were statistically significant but negative, opposite to the hypothesised direction. Four hypotheses (H3, H5, H6, H8) received no statistical support. Celebrity endorsement was the strongest predictor of parasocial attachment (H1: β = 0.691), yet it significantly suppressed perceived enjoyment (H2: β = -0.141) and did not significantly activate emotional arousal (H3: β = 0.086, p = .055). Blind-box

gamification significantly predicted perceived enjoyment (H4: β = 0.505) but not emotional arousal (H5: β = 0.080). Scarcity cues were the dominant activator of emotional arousal (H7: β = 0.683), the largest coefficient among all upstream stimulus paths, but did not significantly predict enjoyment (H6: β = 0.102). At the organism-response stage, emotional arousal was the strongest predictor of both impulse buying (H10: β = 0.598) and repeat purchase (H13: β = 0.571); perceived enjoyment was a consistent, moderate positive predictor of both outcomes (H9: β = 0.294; H12: β = 0.379); and parasocial attachment had no significant positive effect on either outcome, instead showing a significant negative effect on repeat purchase (H11: β = -0.291). Mediation analysis using the specific indirect-effects procedure of Zhao et al. (2010), adapted to PLS-SEM by Hair et al. (2022), showed that emotional arousal mediated 93.2% and 90.9% of scarcity cues' total effects on impulse buying and repeat purchase, respectively, indicating near-complete mediation through an arousal-driven pressure pathway. Perceived enjoyment mediated 75.5% and 81.0% of gamification's effects on impulse buying and repeat purchase, respectively, indicating a largely hedonic mediation pathway. By contrast, celebrity endorsement's indirect effect on impulse buying via parasocial attachment was not significant, while its indirect effect on repeat purchase via parasocial attachment showed near-complete negative mediation (98.1%), confirming that celebrity endorsement's overall relationship with long-term retention operates almost entirely, and negatively, through the parasocial bonds it creates.

4.6 Stimulus Specialisation: Three Stimuli, Three Distinct Pathways

The findings show that celebrity endorsement, blind-box gamification, and scarcity cues operate through three largely separate psychological pathways rather than a single, generalised emotional mechanism. Celebrity endorsement activates parasocial attachment almost exclusively (H1 supported; H2 negative; H3 not significant), gamification activates perceived enjoyment almost exclusively (H4 supported; H5 not supported), and scarcity cues activate emotional arousal almost exclusively (H7 supported; H6 not supported). This pattern challenges earlier S-O-R applications that treat marketing stimuli as functionally interchangeable triggers of a generalised affective response (Eroglu et al., 2001; Zhang et al., 2022), suggesting instead that different marketing tools recruit distinct organismic states with different behavioural and commercial consequences.

4.7 The Scarcity-Arousal and Gamification-Enjoyment Pathways

Scarcity cues emerged as the dominant force in the model, directly activating emotional arousal (H7: β = 0.683), which strongly predicted both impulse buying (H10: β = 0.598) and repeat purchase (H13: β = 0.571), with near-complete mediation through arousal (93.2% and 90.9% respectively). This confirms scarcity operates through an affective, threat-based mechanism consistent with commodity theory (Brock, 1968; Lynn, 1991) and prior evidence on K-pop and blind-box merchandise in Indonesia (Martiza & Hadi, 2025); this arousal more closely resembles anxiety than positive hedonic arousal (Przybylski et al., 2013), and purchases motivated by fear of loss are associated with greater post-purchase regret (Oliver, 1980). Gamification, by contrast, operates through a qualitatively different, intrinsically motivated pathway: it significantly predicts perceived enjoyment (H4: β = 0.505), which mediates most of its effect on repeat purchase (81.0% VAF) and impulse buying (75.5% VAF), consistent with Self-Determination Theory's proposition that intrinsically motivated activities sustain more durable engagement than externally pressured behaviour (Deci & Ryan, 1985) and with evidence that gamification sustains repurchase intention in Indonesian e-commerce (Suratmanto et al., 2025). Commercially, this pathway produces consumers who return voluntarily for the pleasure of the experience, in contrast to the compulsive, pressure-driven repurchasing of the scarcity-arousal pathway.

4.8 Managerial and Theoretical Implications

These findings carry direct managerial implications. Because scarcity cues generate the largest upstream effect but through an anxiety-adjacent mechanism, firms should adopt a responsible scarcity framework with transparent restock information and, where feasible, disclosed drop probabilities. Because gamification reliably produces enjoyment-driven repeat purchase without problematic arousal, firms should prioritise intrinsically motivating game mechanics such as non-monetary collector achievements. Because celebrity endorsement builds parasocial attachment that undermines rather than supports repeat purchase, firms should recalibrate celebrity-marketing budgets away from urgency-oriented flash-sale drops and toward brand-storytelling roles. Only statistically significant paths (H1, H4, H7, H9, H10, H12, and the negative H2 and H11) warrant managerial action; the four non-significant paths (H3, H5, H6, H8) require no intervention. Theoretically, this study extends the S-O-R framework by evidencing stimulus specialisation across three simultaneously modelled stimuli, identifies a boundary condition for Parasocial Interaction Theory in which parasocial attachment amplifies aspirational expectations that

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a probabilistic format systematically fails to meet (an expectation-disconfirmation mechanism eroding rather than sustaining retention), and decouples hedonic enjoyment from threat-based arousal as distinct organismic mediators with opposite implications for consumer well-being.

4.9 Limitations and Future Research

The cross-sectional design cannot establish temporal causality; longitudinal designs would allow the arousal- and enjoyment-driven pathways to be tracked over time. The non-probability purposive sample, while exceeding the minimum required for statistical power, limits generalisability beyond Indonesian Pop Mart consumers aged 18–40. Two Repeat Purchase indicators showed outer VIF values above conventional thresholds (9.985 and 7.354), indicating item redundancy for future refinement. Finally, because the study was conducted within a single brand's ecosystem, future research should test whether this pattern of stimulus specialisation replicates across other blind-box and gamified-retail brands and other Southeast Asian markets.

CONCLUSION

This study examined how celebrity endorsement, blind-box gamification, and scarcity cues shape impulse buying and repeat purchase among 229 Indonesian consumers of Pop Mart's blind-box ecosystem, through the mediating states of parasocial attachment, perceived enjoyment, and emotional arousal/FOMO. Using PLS-SEM with 5,000 bootstrap resamples across thirteen direct hypotheses, the study finds that the three stimuli activate three largely distinct psychological pathways rather than a single generalised affective response: celebrity endorsement primarily builds parasocial attachment, gamification primarily builds hedonic enjoyment, and scarcity cues primarily generate emotional arousal. These pathways carry markedly different behavioural and welfare implications. The scarcity-arousal pathway is the strongest overall driver of impulse buying and repeat purchase but operates through an anxiety-adjacent mechanism that raises sustainability concerns; the gamification-enjoyment pathway is a comparably durable but qualitatively healthier driver of repeat purchase, consistent with intrinsically motivated engagement; and celebrity endorsement, counter-intuitively, undermines long-term repurchase through a parasocial attachment mechanism that generates aspirational expectations the probabilistic blind-box format then systematically fails to meet.

These findings extend the Stimulus-Organism-Response framework by demonstrating stimulus specialisation in a gamified, collectable-retail context and by identifying a boundary condition for Parasocial Interaction Theory in probabilistic consumption formats. Practically, Pop Mart and comparable gamified-retail brands in Indonesia and the wider ASEAN region can pursue commercially sustainable growth by prioritising intrinsically motivating gamification mechanics, adopting more transparent scarcity architectures, and repositioning celebrity endorsement toward brand-storytelling roles rather than urgency-oriented drops. Future research building on the limitations identified in Section 4.9 – particularly longitudinal designs and cross-brand replication – would help establish whether these pathways generalise beyond the present study's context.

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