



Decoding impulse buying in convenience stores: Testing the S–O–R model with deal proneness as a psychological driver in Indonesia

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ABSTRACT

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Impulse buying behavior in Indonesian convenience stores can be studied using the S–O–R framework. Environmental stimuli such as in-store promotion, employee friendliness, and store layout are represented as stimuli; positive emotion as the organism; and impulse buying as the behavioral response. Deal proneness, a psychological factor expected to strengthen the emotional pathway, is also incorporated. A survey involving 260 minimarket shoppers was conducted and analyzed using PLS-SEM with a higher-order construct approach. Results indicated that in-store promotion and well-organized store layout significantly enhanced positive emotion, while employee friendliness did not. However, positive emotion did not influence impulse buying nor mediate the relationship between store stimuli and purchasing behavior. Deal proneness did not moderate the effect of positive emotion but exerted a strong direct impact on impulse buying. These findings suggest that impulse buying in convenience-store settings may not be fully explained by emotional mechanisms within the S–O–R model, and that deal proneness plays a more dominant role as a psychological tendency. This study provides new empirical evidence on how internal consumer traits interact with store stimuli in shaping impulsive purchase decisions in emerging markets.

Contribution/Originality: The current analysis enhances the S-O-R framework literature by showing that not all stimuli given to an organism's emotion cause significant responses. It uniquely reveals that deal proneness directly influences behavior more than emotional mediation, providing a new psychological perspective for retail marketing strategies.

1. INTRODUCTION

The retail industry in Indonesia experienced fluctuations from 2021 to 2023. According to Euromonitor data, there were 4.02 million retail outlets in 2021. The number of retail stores declined by 0.9% to 3.99 million in 2022 and continued to decrease by 0.32% to 3.97 million stores in 2023 (Rizaty, 2023). Although the number of retail stores in Indonesia has decreased annually, Indonesia remains one of the countries with the largest number of retail outlets globally. Indomaret and Alfamart, in particular, rank fourth and fifth in store count worldwide. Based on the United States Department of Agriculture's (USDA) data in the Indonesia: Retail Foods report (July 2023 edition), Indomaret operated 21,828 stores and recorded total sales of US\$7.6 billion in 2022, while Alfamart, with 21,251 stores, generated total sales of US\$7.62 billion (Yonatan, 2024). Therefore, with this current development, it reflects the

growth of domestic consumption along with shifting consumer shopping behavior. Shopping in retail stores is a daily activity for many Indonesians, not only to fulfill daily needs but also involving social interaction and split-second spontaneous decision-making. Vanish, Smith, and Thompson (2021) highlighted that impulse buying behavior is a form of spontaneous decision-making. Therefore, shoppers' behavior must be studied by retailers to understand and identify factors influencing impulsive buying, enabling them to effectively sway shoppers' decisions when purchasing items from retail stores.

Chang, Yan, and Eckman (2014) reported that environmental cues and store design elements have shown a direct influence on consumers' positive emotional states. These emotions have subsequently contributed to impulsive buying tendencies in retail store environments. Their research also highlighted that contextual factors such as the shoppers' amount of funds available, the spare time they have to browse from aisle to aisle, and the nature of their shopping task serve as mediators that shape both emotional responses and impulsive purchases. Atulkar and Kesari (2018) further argued that store atmosphere alone does not automatically generate impulse buying; however, once shoppers have experienced elevated positive moods, they are more likely to remain longer roaming around the store, which increases the likelihood of making unplanned purchases, such as impulsive buying. Gender-related variations are also identified in impulsive buying tendencies.

Goel, Garg, Sharma, and Rana (2024) found that emotional dimensions, particularly regarding arousal and pleasure, act as mediating mechanisms connecting shoppers' sensory perceptions to their impulse buying behavior. Melati, Purwanto, Caturyani, Olivia Irlane, and Widyaningsih (2024) acknowledged that the same trend was observed and showed the urge to buy impulsively. Their theory signifies the most influential mediating factor between claims of popularity scarcity and impulsive purchasing outcomes. This theory also illustrates that age plays a key role in shaping impulse buying decisions. Whereas gender does not seem to have a significant effect.

Throughout the extant literature, a repeated assumption emerges. It concludes that positive emotion frequently serves as a mediating mechanism linking store-related stimuli to shoppers' impulsive buying behavior. For example, Chang et al. (2014) demonstrated that shoppers' emotional reactions are shaped by various store elements, which then encourage impulse buying. Therefore, aligning positive emotion as the internal process is necessary to connect environmental cues (stimulus) to behavioral outcomes (response). Nonetheless, personal preferences among shoppers can generate variations within emotional responses. Although numerous studies have focused on physical attributes such as gender and age, as well as situational factors, for instance, fund availability and time, in elaborating on how emotional conditions could drive spontaneous and unplanned buying behavior. Unfortunately, it seems that these psychological traits have received comparatively limited attention from academic scholars.

Atulkar and Kesari (2018), for instance, noted that materialistic tendencies would generally be displayed more strongly among women. According to the authors, women appeared to be more receptive to appealing store atmospheres, while men exhibited weaker effects. Regarding situational variables, Chang et al. (2014) discovered that the connection between positive emotion and impulse buying was not significantly moderated by time availability; however, fund availability demonstrates a positive moderating influence. Overall, these findings emphasize that the vital pathway to impulsive buying behavior is driven by emotional responses.

A more comprehensive study into understanding impulsive buying behavior was later developed by Mehrabian and Russell (1974), named the Stimulus–Organism–Response (S–O–R) framework. This S–O–R framework was also referenced by Huo, Wang, Sadiq, and Pang (2023), which further provides a useful theory as the foundation for researchers to analyze this study. The S–O–R model theorizes that stimuli can function as environmental cues within a store, acting as agents to initiate positive emotional states within shoppers (organism), which then manifest in behavioral responses such as impulsive buying. For this study, in-store budget-friendly promotions, employees' friendliness, and appealing store layout are examples of stimuli. Emotional states, specifically arousal and pleasure are conceptualized as internal conditions that encourage impulsive buying.

Two primary objectives are designed mindfully for the course of this study: Firstly, to identify the determinants of impulse buying behavior in retail-store settings, and secondly, to analyze whether or not deal proneness moderates the connection between arousal–pleasure emotion and impulse buying. Therefore, this research is guided by these following questions:

1. To what extent do store-atmosphere components influence consumers' positive emotional responses during shopping?
2. Do positive emotional states mediate the relationship between store-atmosphere elements and impulse buying?
3. Does deal proneness moderate the effect of arousal–pleasure emotion on impulse buying behavior?

Commencing on prior research related to impulse buying in retail contexts, where shoppers' emotional reactions to the store environments, and the theoretical foundation of arousal–pleasure emotion was discussed, several hypotheses were formulated to observe the associations between in-store promotion, employee friendliness, store layout, positive emotion, deal proneness, and impulse buying. These hypothesized relationships are empirically tested through a quantitative survey-based study involving retail store shoppers.

Therefore, this study aims to extend the S-O-R framework by introducing deal proneness as a key moderating psychological trait. This research specifically investigates how deal proneness interacts with environmental stimuli to influence impulse buying behavior in Indonesian retail stores. Overall, it offers fresh insights into the theoretical contribution of retail psychology.

2. UNDERPINNING THEORY

To provide a comprehensive understanding of impulse buying behavior, this study integrates the Theory of Consumption Values (TCV) and the concept of Hedonism within the structural mechanism of the Stimulus–Organism–Response (S–O–R) framework. While the S–O–R model provides the causal pathway (Mehrabian & Russell, 1974), TCV and Hedonism serve as the primary theoretical lenses to define the nature of the environmental stimuli and the consumer's internal state, respectively.

The S–O–R framework, originally proposed by Mehrabian and Russell (1974), posits that environmental cues (Stimulus) generate internal emotional or cognitive states (Organism), which subsequently drive approach or avoidance behaviors (Response). In the context of retail, this framework is particularly robust for explaining unplanned actions. As noted by Donovan and Rossiter (1982), store-related stimuli such as atmosphere, layout, and cues do not directly dictate purchase; rather, they elicit emotional reactions that mediate the behavior. This study adopts S–O–R as the overarching structure, where in-store promotion, employee friendliness, and store layout (S) trigger positive emotions (O), resulting in impulse buying (R).

In order to theoretically justify the selection of environmental variables, the researchers utilized the Theory of Consumption Values (TCV). Sheth, Newman, and Gross (1991) identified that a shopper's choice when it came to buying was driven by functional, social, emotional, epistemic, and conditional values. In this study, the selected stimuli (In-store Promotion, Employee Friendliness, Store Layout) were not merely physical attributes but carriers of these values. For instance, functional and conditional value (monetary savings) were delivered by In-store Promotion, while social and emotional gratification was provided by Employee Friendliness (Turley & Milliman, 2000). Mason, Oduro, Umar, and Zamparo (2023) had later emphasized that emotional value was often identified as the strongest predictor of behavior. Thus, the researchers argue that these store attributes are indeed effective stimuli because they can successfully convey these underlying consumption values to shoppers.

The Organism component in this study is firmly carried out through the lens of Hedonism. Unlike the concept of utilitarianism, which is more focused on task fulfillment, Watson (1876) and Babin, Darden, and Griffin (1994) conceptualized hedonism as the pursuit of intrinsic pleasure and enjoyment. In the context of impulsive buying, internal processing is highly affective rather than cognitive. This concept is supported by Fredrickson (2005)

Broaden-and-Build theory, which argues that positive emotions broaden an individual's thought-action repertoire and encourage exploration. Therefore, the researchers define "Organism" as the generation of positive emotion (pleasure and arousal), rather than cognitive evaluation.

Impulse Buying (R) as the final outcome is defined as a sudden and compelling urge to purchase, acting as an outlet for hedonic emotions (Rook, 1987). However, the transition from feeling good (O) to the actual act of buying (R) is not uniform across individuals. Here, we integrate Deal Proneness (Lichtenstein, Netemeyer, & Burton, 1990) as a critical moderator on the Organism to Response path. We postulate that deal proneness acts as a catalyst that strengthens the conversion of emotion into action. For consumers with high deal proneness, the Positive Emotion experienced in-store is significantly more likely to trigger an Impulse Purchase due to the additional psychological satisfaction derived from the "transactional win" (Iranmanesh, Jayaraman, Zailani, & Ghadiri, 2017).

The theoretical integration and variable operationalization are summarized in Table 1.

Table 1. Theoretical mapping and variable operationalization.

Theory / Key Studies	Finding	Role in Current Study
S-O-R Framework (Donovan & Rossiter, 1982; Mehrabian & Russell, 1974)	Environment drives emotional states and behavior.	Structural Backbone (Stimulus → Organism → Response).
Theory of Consumption Values (Mason et al., 2023; Sheth et al., 1991)	Consumption is driven by functional, social, & emotional values.	Defines Stimulus (S) Justifies Store Layout, Promotion, & Employee Friendliness as value-carriers.
Hedonism & Broaden-and-Build Theory (Babin et al., 1994; Fredrickson, 2005)	Pleasure-seeking behavior; positive emotion expands action.	Defines Organism (O) Operationalized strictly as Positive Emotion (Affective state).
Impulse Buying Behavior (Beatty & Ferrell, 1998; Rook, 1987)	Sudden, compelling, hedonically complex purchasing urge.	Defines Response (R) The behavioral outcome acting as an outlet for emotion.
Deal Proneness (Iranmanesh et al., 2017; Lichtenstein et al., 1990)	Psychological tendency to respond favorably to purchase offers.	Moderator Variable (O → R). Strengthens the conversion of Positive Emotion into Impulse Buying.

3. LITERATURE REVIEW AND HYPOTHESES

Upon prior studies by synthesizing the developed hypotheses, the S-O-R framework is constructed to be the base model for this research. As depicted in Figure 1, the model shows that linking the store atmosphere (In-store Promotion, Employee Friendliness, Store Layout) to Impulse Buying behavior through the mediation of Positive Emotion. Moreover, the model suggests that Deal Proneness regulates the path between positive emotion and the final purchasing decision.

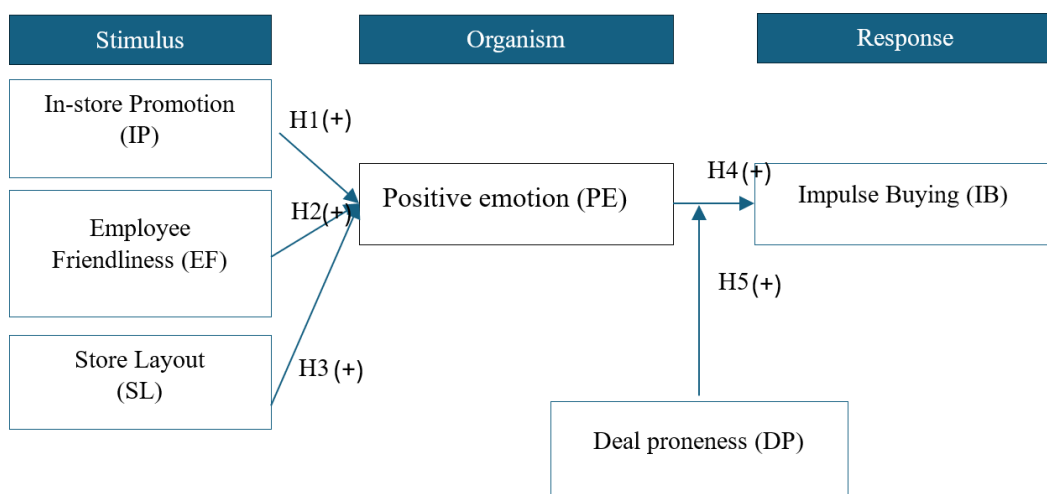


Figure 1. Proposed Research Model based on S-O-R Framework.

Moreau, Krishna, and Harlam (2001) described that personal selling approach, in-store product displays, and various price-related promotions act as activities within in-store promotion. Maharani, Helmi, Mulyana, and Hasan (2020) further confirmed that efforts made in in-store promotions significantly enhanced shoppers' value and purchasing intention. Chang et al. (2014) noted that shoppers' positive emotional states shape impulse buying, which typically occurs alongside emotional experiences, particularly excitement and pleasure. Moes, Fransen, Fennis, Verhagen, and van Vliet (2022) added that a high level of interaction in physical retail environments increases shoppers' motivation to visit stores and engage in impulsive buying. A related point connected to Fam et al. (2011) asserts that in-store promotion is a key component of marketing strategies. Overall, these studies illustrate that in-store promotion plays an important role in encouraging positive emotional responses.

H₁: In-store promotion positively affects the positive emotion.

Gremler and Gwinner (2000) stated that relationships have been a significant aspect when running a business. The connection between satisfaction dimensions, loyalty intentions, and word-of-mouth communication forms a positive relationship that allows a business to survive and shape stronger attachments with its shoppers. Ryzhkova (2018) later explained that friendliness was conveyed verbally, such as by soft voice intonation and a friendly tone, and nonverbally through various facial expressions and body gestures. Tsai (2001) showed a positive relation between psychological perceptions of friendly service and positive emotions. This connection reflected an increased willingness from shoppers to continually return to the store and deliver positive comments to others. Research previously conducted by Kraus, Sen, Savitskie, Kumar, and Brooks Jr (2022) showed that customer satisfaction was significantly influenced by employees' friendliness and word-of-mouth behavior. Mohan, Sivakumaran, and Sharma (2013) indicated that employees' friendliness was one of the dominant factors in shaping the store environment, which then significantly influenced impulsive buying. Meanwhile, Boninsegni, Furrer, and Mattila (2021) stated that informal behaviors, such as direct face-to-face interaction in services, created emotional connections with shoppers. Based on the above studies, the friendliness of employees has influenced customers' positive emotions during shopping.

H₂: Employee friendliness positively affects positive emotion.

Kiran, Majumdar, and Kishore (2012) clarified that for shoppers to access information easily such as price, location, availability, and promotions without relying on store personnel, innovative and well-organized product arrangements in retail settings are highly needed.

Thereby, enhancing the overall shopping experience and supporting split-second decisions to buy items from the store. Arianty, Gultom, Yusnandar, and Arif (2024) further reported that price discounts and atmospheric cues, particularly in visual elements, elicit emotional reactions and shape consumer perceptions, significantly influencing positive emotions and creating impulsive buying. Chatzoglou, Chatzoudes, Savvidou, Fotiadis, and Delias (2022) also highlighted that an appealing and inviting atmosphere from the store layout affects shoppers' experience and can later stimulate repeated purchasing behavior.

Kholis, Saifuddin, and Arif (2023) revealed that positive emotional responses were directly stimulated by sales promotions and hedonic tendencies. Which in turn, could strongly predict impulsive buying. Although some researchers suggested that store atmosphere did not always produce positive emotional responses or impulsive buying, other studies had emphasized the important role of positive emotions in influencing impulse buying tendencies. Florea, Croitoru, Coman, and Coman (2025) identified that product displays, store ambiance, and layout are various atmospheric components that can distinctly shape shoppers' behavior, foster enjoyable shopping experiences, stimulate impulsive purchases, and support long-lasting loyalty from the outset. Similarly, Setiawan and Ardani (2022) found that store atmospheres positively and significantly influenced both positive emotions and impulse buying. Maintaining store cleanliness and providing hygiene facilities such as hand sanitizer and hand-washing areas are examples of inviting yet enticing atmospheres throughout the store. Collectively, these studies illustrate that managing store layout can contribute to creating shoppers' positive emotional responses while shopping.

H₃: Store layout positively affects positive emotion.

According to Stern (1962), impulse buying had been referred to as unplanned purchases made with minimal cognitive deliberation. Beatty and Ferrell (1998) further described impulsive buying as a spontaneous purchasing response triggered by hedonic stimuli. Eroglu, Machleit, and Davis (2003) noted that pleasure reflected the extent to which individuals experience happiness, joy, and satisfaction; while arousal represented heightened sensory stimulation, energy, or excitement. Donovan and Rossiter (1982) extended this perception to the retail environment, arguing that various in-store elements helped to elevate the store atmosphere, interpreted through two dominant emotional states: pleasure and arousal. Both served as mediators influencing in-store behavior. Donovan, Rossiter, Marcoolyn, and Nesdale (1994) stated that the same trend was observed, with pleasure being experienced shortly after shopping began. This helped predict both the additional time shoppers spent in the store and the increase in spending.

Xu, Dzever, and Zhao (2023) reported that impulsive buying was significantly contributed by the combined emotion of arousal–pleasure. Tifferet and Herstein (2012) observed that stronger hedonic consumption tendencies tend to be exhibited by women, with a much higher level of impulsive buying compared to men. Huang (2017) emphasized that pleasure and arousal played central roles in shaping consumers' impulsive buying intentions, with pleasure exerting a stronger influence than arousal. Tanveer, Kazmi, and Rahman (2022) also demonstrated that shoppers' mood positively impacted impulse buying. A related point made by Reisenzein (1994) explained that emotional intensity was determined by the magnitude of pleasure and arousal.

All things considered, these studies suggest that positive emotional states are represented by the emergence feeling of arousal and pleasure, which mediate the relationship between store-atmosphere variables (such as in-store promotion, employee friendliness, and store layout) and impulsive buying behavior.

H₁: Positive emotion mediates impulsive buying with in-store promotion, employee friendliness, and store layout.

Lichtenstein et al. (1990) characterized deal proneness as an individual's heightened awareness of promotional offers, where the setup of the promotion itself helped shape positive shopper assessments when making purchasing decisions. Mohan, Sivakumaran, and Sharma (2012) further demonstrated that deal proneness, along with store atmosphere, could encourage shoppers to seek a variety of in-store products, thereby contributing to impulsive buying behavior.

Helmi, Oesman, Kaltum, and Faisal (2023) reported that hedonistic value and outgoingness exert strong effects on impulsive buying, noting that extroverted individuals tend to be enthusiastic, sociable, and comfortable in social settings. This makes them more inclined toward purchasing activities. In addition, Iranmanesh et al. (2017) showed that deal proneness moderates the negative association between perceived savings, perceived quality, perceived self-expression value, and perceived convenience, with consumers' purchase intentions when looking for grocery products under Virtual Display (VD) conditions. Since perceived savings represent the opposite of impulse buying tendencies, the results suggest that deal proneness ultimately strengthens consumers' chances to engage in impulsive buying.

H₂: Deal proneness moderates the effect of positive emotion on impulse buying.

This study includes four variables to better understand impulsive buying. First, the independent variables (Stimulus) such as In-store Promotion (IP), Employee Friendliness (EF), and Store Layout (SL). Second, the dependent variable (Response) is impulsive buying itself. Third, the mediating variable (Organism) is positive emotion (PE). Lastly, the moderating variable is Deal Proneness (DP). All four variables can influence the relationship between positive emotion and impulse buying. Overall, this study examines the direct and indirect relationships among these variables in the retail industry, particularly in the cashier area of retail stores.

4. METHODOLOGY

4.1. Data Collection and Sampling

In this investigation, a descriptive–associative framework was utilized with minimal interference by the researchers. Data were gathered through a questionnaire based on the measurement instruments used in prior studies.

This research was carried out in a natural, non-contrived setting, involving respondents with previous shopping experience in retail stores. Data collection followed a cross-sectional timeline, ensuring the information was captured at a single specific occasion.

The sample consisted of minimarket shoppers aged 18 years and above residing in the Jabodetabek area who had made purchases at Indomaret or Alfamart within the past month. Jabodetabek is known for hosting the largest concentration of modern minimarket outlets in Indonesia. It was selected due to its high representativeness. In this study, a non-probability sampling technique, specifically convenience sampling, was used for participant selection. Consequently, the findings may have limitations regarding generalizability to the broader population beyond the Jabodetabek area.

The targeted sample size comprised 206 respondents, determined based on guidelines suggesting sample sizes between 30 and 500, along with the rule of thumb for complex multivariate procedures such as PLS-SEM (Memon et al., 2020). This target exceeded the minimum requirement of at least five times the number of measurement items (37 items), as suggested by Hair, Risher, Sarstedt, and Ringle (2019). The sample size aimed to ensure adequate validity and reliability for multivariate analysis.

Data collection took place between July and September 2025 via an online survey. A total of 309 responses were obtained, and after screening, 260 valid questionnaires were retained for further analysis. Descriptive statistics for the sample are presented in Table 2.

Table 2. Sample characteristics.

Characteristics	Frequency	Percentage (%)
N = 260		
Gender		
Male	154	59.23%
Female	106	40.77%
Age		
18 to 30	56	21.54%
31 to 40	137	52.69%
41 to 50	56	21.54%
Above 50	11	4.23%
Jobs		
Employee	222	85.38%
Housewife	19	7.31%
Entrepreneur	7	2.69%
Other	12	4.62%
Monthly expenses		
Under 1 million IDR	18	6.92%
1 to 3 million IDR	83	31.92%
3.1 to 5 million IDR	51	19.62%
Above 5 million IDR	108	41.54%
Convenience Store		
Indomaret Group	132	50.77%
Alfamart Group	108	41.54%
Others	20	7.69%
Store Location		
Jakarta	132	50.77%
Bekasi	49	18.85%
Depok	27	10.38%
Bogor	29	11.15%
Tangerang	23	8.85%

4.2. Scale Development

For measuring the variables, the measurement method was implemented and revised from the current literature across numerous businesses that have remained relevant to retail stores. The items used in this study were assessed

using a 6-point Likert scale, with endpoints ranging from Strongly Disagree to Strongly Agree. The Likert scale was selected because of its ease of application, and a 6-point scale was chosen to align with considerations within the local culture, whereby no neutral option was provided. These measurement items are used to assess the variables, including In-Store Promotion (IP) (multidimensional, consisting of Promotional Instrument Attraction (PIA) and Promotional Instrument Frequency (PIF)). These items were adapted from Maharani et al. (2020); Chatzoglou et al. (2022); Nordfält and Lange (2013), and Yoo, Donthu, and Lee (2000). The items of Employee Friendliness (EF) were adjusted from Kraus et al. (2022) and Mohan et al. (2013). The items of Store Layout (SL) were adapted from Mohan et al. (2013) and Kumar and Kim (2014). The items of Positive Emotion (PE) (multidimensional, consisting of Arousal Emotion (AR) and Pleasure Emotion (PL)) were used from Xu et al. (2023) and Bandyopadhyay, Sivakumaran, Patro, and Kumar (2021). The items of Deal Proneness (DP) were utilized from Mohan et al. (2012) and Iranmanesh et al. (2017). The items of Impulse Buying (IB) were applied from Chang et al. (2014), Beatty and Ferrell (1998), and Bandyopadhyay et al. (2021).

4.3. Data Analysis

Since multidimensional variables were present in IP and PE, data analysis was conducted in two stages. First, reliability and validity testing at the Lower Order Construct (LOC) level was performed to obtain the Latent Variable Scores (LVS) for the first-order constructs of IP and PE. The second stage involved testing at the Higher Order Construct (HOC) level. All variables were modeled as reflective–reflective constructs. The analysis referenced works by Hair et al. (2019) and Sarstedt, Hair, Cheah, Becker, and Ringle (2019). PLS-SEM was used for the data analysis process.

In Stage 1, analysis was conducted at the Lower Order Construct (LOC) level. The calculation was conducted using the PLS Algorithm. The measurement evaluation included: loading factor > 0.708 (or ≥ 0.50 under a more conservative criterion). Reliability was evaluated through Cronbach's Alpha and Composite Reliability, applying a minimum acceptable value of > 0.70 and not exceeding 0.95. Convergent validity was examined using the Average Variance Extracted (AVE), with the acceptable threshold set at ≥ 0.50 . Discriminant validity was assessed by using HTMT, with a recommended value below 0.85 or ≤ 0.90 under a more relaxed criterion. After fulfilling all reliability and validity conditions, Latent Variable Scores (LVS) for PIA, PIF, AR, and PL were generated to be used in the next stage of analysis.

In Stage 2, the analysis proceeded continually using a Higher Order Construct (HOC) approach with the PLS Algorithm. LVS for PIA and PIF served as indicators for the second-order construct IP, while LVS for AR and PL were represented as indicators for the second-order construct PE. Reliability and validity were reassessed at this level, and once all criteria were satisfied, the analysis moved to an advanced stage of hypothesis testing.

For this stage of hypothesis testing, a one-tailed bootstrapping method was used. The directionality of effects was determined based on the sign of the Beta coefficient. A relationship between variables was considered statistically significant when the t-value exceeded 1.96 and the p-value was below 0.05 in the path coefficients. For mediation testing, both specific indirect effects and total indirect effects were reviewed; variations in Beta, t-values, and p-values signaled the presence of mediation. For moderation testing, the path coefficient of the moderating variable was interpreted using the same criteria for Beta direction, t-value, and p-value.

5. RESULTS

5.1. Measurement Model

5.1.1. Lower Order Construct (LOC)

As illustrated in Figure 2, it exhibited the PLS-SEM results for Stage 1, which assessed the Lower Order Construct (LOC), while Table 3 provides detailed numerical outputs. With regard to the loading factors, all items

except SL.1 had met the recommended threshold of ≥ 0.708 (Hair et al., 2019). Even under a more conservative cutoff of ≥ 0.50 , all measurements of the indicators had shown to fulfil the loading requirement.

Reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR). The Cronbach's Alpha coefficients ranged from 0.868 to 0.943, while Composite Reliability values were between 0.910 and 0.959. Both indicators exceeded the recommended minimum value of 0.70 (Hair et al., 2019), confirming that construct reliability was achieved.

Convergent validity was assessed through the Average Variance Extracted (AVE). Following the reference from Hair et al. (2019), where an AVE value of ≥ 0.50 indicated that the items appropriately converged to represent their basic construct. The results showed that all constructs achieved AVE values above 0.50, confirming convergent validity. Table 3 (Hair et al., 2019) also confirmed that construct reliability was achieved. Table 3 provides detailed AVE values for each construct.

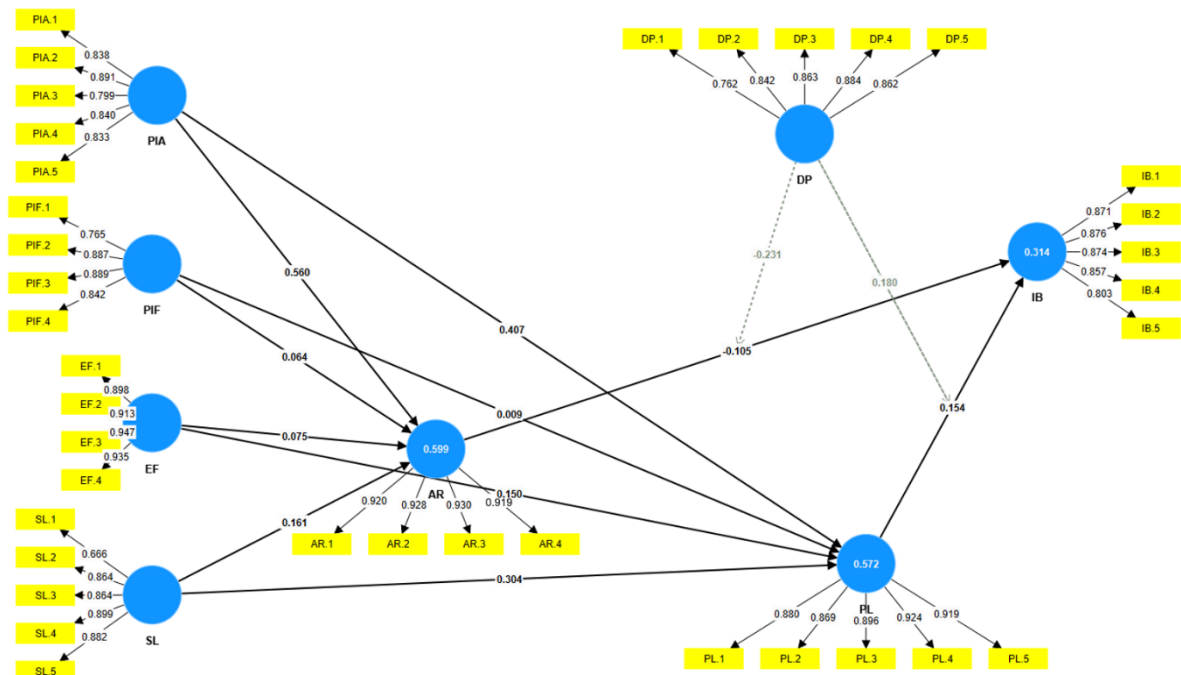


Figure 2. Lower Order Construct (LOC).

Table 3. Factor loading, Cronbach's alpha, composite reliability, average variance extracted (LOC).

Construct	Items	Factor Loading	Cronbach's alpha	CR	AVE
AR	AR.1	0.920	0.943	0.959	0.855
	AR.2	0.928			
	AR.3	0.930			
	AR.4	0.919			
DP	DP.1	0.762	0.900	0.925	0.712
	DP.2	0.842			
	DP.3	0.863			
	DP.4	0.884			
	DP.5	0.862			
EF	EF.1	0.898	0.942	0.958	0.852
	EF.2	0.913			
	EF.3	0.947			
	EF.4	0.935			
IB	IB.1	0.871	0.911	0.932	0.734
	IB.2	0.876			
	IB.3	0.874			
	IB.4	0.857			
	IB.5	0.803			

Construct	Items	Factor Loading	Cronbach's alpha	CR	AVE
PIA	PIA.1	0.838	0.896	0.923	0.707
	PIA.2	0.891			
	PIA.3	0.799			
	PIA.4	0.840			
	PIA.5	0.833			
PIF	PIF.1	0.765	0.868	0.910	0.718
	PIF.2	0.887			
	PIF.3	0.889			
	PIF.4	0.842			
PL	PL.1	0.880	0.940	0.954	0.807
	PL.2	0.869			
	PL.3	0.896			
	PL.4	0.924			
	PL.5	0.919			
SL	SL.1	0.666	0.893	0.922	0.705
	SL.2	0.864			
	SL.3	0.864			
	SL.4	0.899			
	SL.5	0.882			

Discriminant validity describes the degree to which measurements of different constructs are truly distinct from one another. This study applied the Fornell–Larcker criterion, which states that discriminant validity is achieved when the square root of a construct's AVE exceeds its correlations with other constructs (Hair et al., 2019). The results confirmed this requirement; the square root of the AVE for each construct was higher than its inter-construct correlations, as shown in Table 4. Additionally, the Heterotrait–Monotrait Ratio (HTMT) was used to assess the estimated correlations between constructs. Discriminant validity was considered adequate when HTMT values fell within acceptable limits. According to Hair et al. (2019), HTMT values should be below 0.85 to indicate conceptually different constructs and below 0.90 for similar constructs. The HTMT results in Table 5 demonstrated that all HTMT ratios met the required threshold of 0.90, except for PIA and PIF, components of the same multidimensional construct, In-Store Promotion (IP).

Table 4. Fornell-Larcker criterion (LOC).

Construct	AR	DP	EF	IB	PIA	PIF	PL	SL
AR	0.924							
DP	0.761	0.844						
EF	0.506	0.503	0.923					
IB	0.425	0.543	0.267	0.857				
PIA	0.752	0.664	0.513	0.413	0.841			
PIF	0.658	0.591	0.546	0.322	0.809	0.847		
PL	0.848	0.731	0.569	0.435	0.683	0.608	0.898	
SL	0.604	0.542	0.674	0.357	0.629	0.616	0.667	0.839

Table 5. Heterotrait-Monotrait Ratio (LOC).

Construct	AR	DP	EF	IB	PIA	PIF	PL	SL	DP x AR	DP x PL
AR										
DP	0.832									
EF	0.537	0.559								
IB	0.434	0.551	0.275							
PIA	0.816	0.740	0.556	0.431						
PIF	0.725	0.668	0.603	0.341	0.918					
PL	0.897	0.813	0.605	0.444	0.738	0.667				
SL	0.648	0.611	0.735	0.374	0.694	0.697	0.722			
DP x AR	0.256	0.277	0.010	0.220	0.175	0.065	0.206	0.076		
DP x PL	0.206	0.259	0.013	0.171	0.134	0.060	0.206	0.070	0.926	

Based on Table 5, the Promotional Instrument Attraction (PIA) and Promotional Instrument Frequency (PIF) have shown to exhibit a similar relationship in nature because they had an HTMT ratio greater than 0.90. According to Maharani et al. (2020), both were dimensions of In-Store Promotion (IP).

Acknowledging that both are dimensions of a multidimensional variable under IP, it is necessary to examine further whether there are indicators in the cross-loading results that might have close values and may influence each other. Along with this,

Table 6 emphasizes that the relationship between PIA and PIF had a relatively close distance compared to other variables. The indicator PIF.1 showed that the closest cross-loading value relative to PIA had a difference of 0.108. Therefore, the indicator PIF.1 was removed from the measurement items to obtain an HTMT value, reaching the threshold of 0.90, as presented in Table 7.

Table 6. Cross-loading PIA and PIF (LOC).

Items	PIA	PIF	PIA – PIF	PIF – PIA
PIA.1	0.838	0.678	0.160	
PIA.2	0.891	0.700	0.191	
PIA.3	0.799	0.626	0.173	
PIA.4	0.840	0.703	0.136	
PIA.5	0.833	0.688	0.145	
PIF.1	0.657	0.765		0.108
PIF.2	0.684	0.887		0.203
PIF.3	0.705	0.889		0.184
PIF.4	0.698	0.842		0.144

PIF.1 was identified as the measurement item that weakened the relationship between PIA and PIF, leading to its removal from the model. Consequently, the HTMT ratio in the Stage 1 Lower Order Construct (LOC) analysis is now as follows.

Table 7. HTMT Indicators without PIF.1 (LOC).

Construct	AR	DP	EF	IB	PIA	PIF	PL	SL	DP x AR	DP x PL
AR										
DP	0.832									
EF	0.537	0.559								
IB	0.434	0.551	0.275							
PIA	0.816	0.740	0.556	0.431						
PIF	0.722	0.657	0.593	0.321	0.884					
PL	0.897	0.813	0.605	0.444	0.738	0.667				
SL	0.648	0.611	0.735	0.374	0.694	0.689	0.722			
DP x AR	0.256	0.277	0.010	0.220	0.175	0.060	0.206	0.076		
DP x PL	0.206	0.259	0.013	0.171	0.134	0.058	0.206	0.070	0.926	

5.1.2. Higher Order Construct (HOC)

In the second stage of the calculation, the Higher Order Construct (HOC), the Latent Variable Scores (LVS) of PIA and PIF became the measurement items for In-Store Promotion (IP), while the LVS of AR and PL became the measurement items for Positive Emotion (PE). Thus, the model in the second stage is shown in Figure 3.

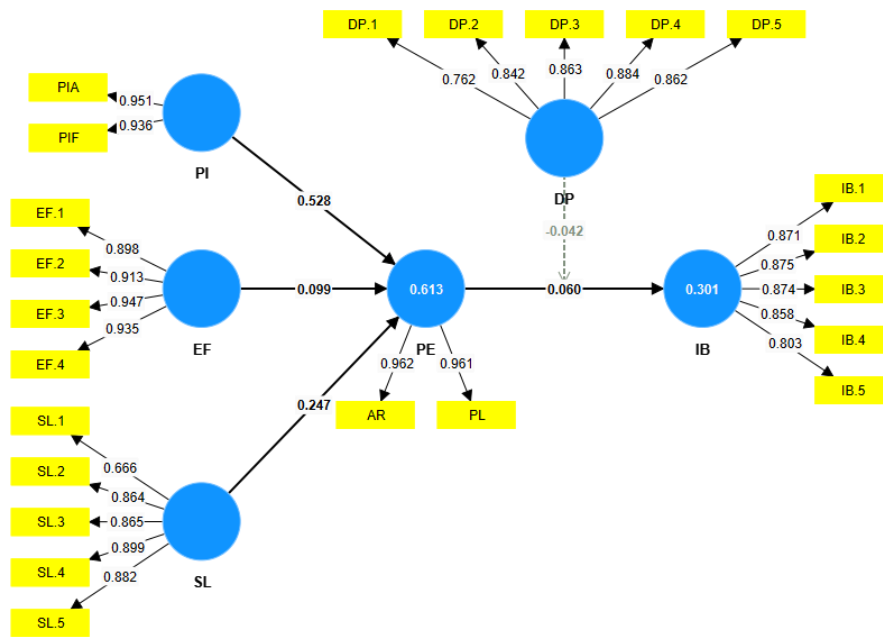


Figure 3. Higher order construct (HOC).

As part of the measurement model assessment, all constructs were examined for reliability and convergent validity. Following the guidelines of Sarstedt et al. (2019) for higher-order constructs, validity was established by assessing the significance and magnitude of loadings from the lower-order components on the higher-order constructs. The evaluation results indicated that reliability and validity criteria for the higher-order constructs were satisfied. Discriminant validity was assessed among the lower-order constructs and between the higher-order constructs, along with other latent variables in the model. However, assessment was not conducted between the higher-order constructs and their own lower-order components, as they were inherently correlated by design. Reliability and convergent validity for the remaining constructs were also confirmed, as their reliability coefficients surpassed 0.70 and their AVE values exceeded 0.50, as reported in Table 8. Alongside the reliability and convergent validity tests, discriminant validity between the higher- and lower-order constructs was also assessed. Based on the Fornell and Larcker (1981) criterion, the square root of each construct's AVE was greater than its correlations with other constructs, as presented in Table 9. Additionally, the HTMT ratios were found to be below the 0.90 threshold, as shown in Table 10, thereby supporting the discriminant validity of the measurement model.

Table 8. Factor loading, Cronbach's alpha, composite reliability, and average variance extracted (HOC).

Construct	Items	Factor Loading	Cronbach's alpha	CR	AVE
DP	DP.1	0.762	0.900	0.925	0.712
	DP.2	0.842			
	DP.3	0.863			
	DP.4	0.884			
	DP.5	0.862			
EF	EF.1	0.898	0.942	0.958	0.852
	EF.2	0.913			
	EF.3	0.947			
	EF.4	0.935			
IB	IB.1	0.871	0.911	0.932	0.734
	IB.2	0.875			
	IB.3	0.874			
	IB.4	0.858			
	IB.5	0.803			
IP	PIA	0.951	0.877	0.942	0.890
	PIF	0.936			
PE	AR	0.962	0.918	0.961	0.924

Construct	Items	Factor Loading	Cronbach's alpha	CR	AVE
	PL	0.961			
SL	SL.1	0.666	0.893	0.922	0.705
	SL.2	0.864			
	SL.3	0.865			
	SL.4	0.899			
	SL.5	0.882			

Table 9. Fornell-Larcker Criterion (HOC).

Variables	DP	EF	IB	IP	PE	SL
DP	0.844					
EF	0.503	0.923				
IB	0.544	0.267	0.857			
IP	0.661	0.555	0.385	0.944		
PE	0.776	0.559	0.448	0.746	0.961	
SL	0.542	0.674	0.358	0.656	0.661	0.839

Table 10. Heterotrait-Monotrait Ratio (HOC).

Variables	DP	EF	IB	IP	PE	SL	DP x PE
DP							
EF	0.559						
IB	0.551	0.275					
IP	0.744	0.612	0.400				
PE	0.868	0.601	0.464	0.827			
SL	0.611	0.735	0.374	0.736	0.721		
DP x PE	0.273	0.009	0.199	0.117	0.236	0.074	

5.2. Structural Model

In the model testing and hypothesis testing stage, one-tailed bootstrapping analysis was used, and the results are displayed in Figure 4.

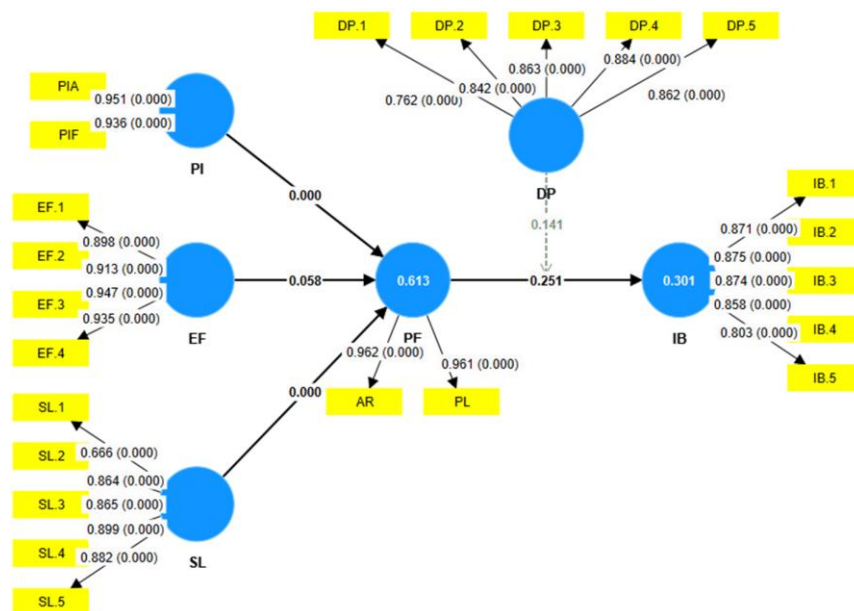


Figure 4. Bootstrapping Results (HOC).

5.2.1. Path Coefficients Analysis

In structural equation modeling, the path coefficients were analyzed to assess the hypothesized relationships between variables and support the proposed hypotheses. From the bootstrapping calculation results, the path coefficient values were obtained. As shown in Table 11, H1 was supported because IP had a significant effect on PE

($\beta = 0.528$, $t = 9.325$, $p = 0.000$). H2 was rejected because EF had a non-significant effect on PE ($\beta = 0.099$, $t = 1.572$, $p = 0.116$). H3 was supported because SL had a significant effect on PE ($\beta = 0.247$, $t = 3.523$, $p = 0.000$). H4 was rejected because PE had a non-significant effect on IB ($\beta = 0.060$, $t = 0.672$, $p = 0.502$).

For the moderation analysis, H5 was rejected because DP did not act as a moderator between PE and IB (H5: $\beta = -0.042$, $t = 1.076$, $p = 0.282$). The Two-Stage approach is known to mitigate collinearity issues between the interaction term and the main effects better than the standard product-indicator approach. For the interaction term DP x PE (VIF = 1), which was well below the conservative threshold of 3 (Hair et al., 2019), confirming that multicollinearity was not an issue within the researchers' estimation.

Nevertheless, the results also emphasized that Deal Proneness (DP) had a significant direct effect on IB. This finding indicates that Deal Proneness single-handedly drives impulse buying, without passing through emotional mechanisms. In other words, when consumers are exposed to promotions, they are inclined to make impulse purchases due to the appeal of the promotion itself, rather than the positive emotions they are experiencing at that moment ($\beta = 0.482$, $t = 5.819$, $p = 0.000$). A path coefficient β of 0.482 indicated a substantial positive relationship, implying that for every one standard deviation increase in Digital Promotion (DP), Impulse Buying (IB) increased by 0.482 of standard deviations, holding other variables constant. In the context of shoppers' behavior, this measurement suggests that DP is not merely a statistically significant predictor but a primary force of IB. To further support this practical relevance, the researchers examined the effect size f^2 , which yielded a value of 0.130. According to Cohen (1988), this represented a medium effect size. This further confirms that the economic impact of promotion in generating impulse buying is significant and practically meaningful for marketing strategy in retail stores.

Table 11. Path Coefficients (HOC).

Hypotheses	Path	Coefficient (β)	STDEV	t-statistics	p-Values
H1	H1: IP -> PE	0.528	0.057	9.325	0.000
H2	H2: EF -> PE	0.099	0.063	1.572	0.116
H3	H3: SL -> PE	0.247	0.070	3.523	0.000
H4	H4: PE -> IB	0.060	0.089	0.672	0.502
H5	H5: DP x PE -> IB	-0.042	0.039	1.076	0.282
N/A	DP -> IB	0.482	0.083	5.819	0.000

5.2.2. Mediation Analysis

To analyze the mediating relationships among the modeled variables, the Specific Indirect Effects and Total Indirect Effects were examined and compared. Based on the bootstrapping calculation results as presented in Table 12 (Specific Indirect Effects), H4a was rejected because the partial mediating role of PE between IP and IB did not show any significant result (H4a: $\beta = 0.031$, $t = 0.668$, $p = 0.504$).

H4b was also rejected, owing to the partial mediating role of PE between EF and IB being not significant either (H4b: $\beta = 0.006$, $t = 0.564$, $p = 0.572$). H4c was rejected too because the partial mediating role of PE between SL and IB was insignificant (H4c: $\beta = 0.015$, $t = 0.612$, $p = 0.541$).

The Total Indirect Effects results, as shown in Table 13, illustrated that the relationships between In-Store Promotion (IP), Employee Friendliness (EF), Store Layout (SL), and Impulse Buying (IB) are not significant, with β , t , and p -values identical to those shown in the Specific Indirect Effects in Table 12. Following that analysis, PE does not partially mediate the relationships between IP, EF, and SL and IB.

Table 12. Specific indirect effects.

Hypotheses	Path	Coefficient (β)	STDEV	t-statistics	p-Values
H4a	IP -> PE -> IB	0.031	0.047	0.668	0.504
H4b	EF -> PE -> IB	0.006	0.010	0.564	0.572
H4c	SL -> PE -> IB	0.015	0.024	0.612	0.541

Table 13. Total indirect effects.

Hypotheses	Path	Coefficient (β)	STDEV	t-statistics	p-Values
H4a	IP $\rightarrow$ IB	0.031	0.047	0.668	0.504
H4b	EF $\rightarrow$ IB	0.006	0.010	0.564	0.572
H4c	SL $\rightarrow$ IB	0.015	0.024	0.612	0.541

6. DISCUSSION AND IMPLICATIONS

6.1. Discussion

The results of this study have confirmed that in-store promotion (IP) has a positive effect on positive emotion (PE). Hence, this hypothesis is accepted. This finding also aligns with Moreau et al. (2001), who had stated that in-store promotions, whether through personal selling, product arrangement, or price promotions were able to attract shoppers' attention and eventually stimulate positive emotion.

Therefore, in-store promotion not only functions as part of the marketing mix but also serves as an emotional stimulus that later enhances shoppers' shopping experience.

Meanwhile, the results of this study do not show a significant relationship between employee friendliness (EF) and positive emotion (PE); thus, this hypothesis is rejected. According to Calvert, Pathak, Ching, Trufil, and Fulcher (2019), shoppers did not always interpret employee friendliness as genuinely sincere behavior. Shoppers today are increasingly aware of expressive behavior from service providers.

In addition, the results also illustrate that store layout (SL) has a positive effect on positive emotion (PE); following that, this hypothesis is accepted. This finding supports previous research by Kiran et al. (2012), which showed that informative retail product arrangements were able to facilitate shoppers' access to product information, thereby creating a pleasant shopping experience. Arianty et al. (2024) and Setiawan and Ardani (2022) also found that visual store elements and a comfortable atmosphere could generate positive emotions. This was further supported by Chatzoglou et al. (2022) and Florea et al. (2025), who showed that store layout facilitated shaping the shoppers' experience and created an engaging shopping environment that triggered positive emotional responses. However, the findings of this study have later illustrated that positive emotion (PE) does not exert a significant influence on impulse buying (IB).

Consequently, PE also does not mediate the relationships between in-store promotion, employee friendliness, and store layout with impulse buying, leading to the rejection of the tested hypothesis. As noted by Donovan and Rossiter (1982), shoppers typically experienced higher enjoyment and increased spending when their emotional state included moderate to high levels of pleasure and arousal simultaneously. The absence of a significant effect in this study may be credited to the possibility that the level of positive emotion experienced by respondents was not sufficiently strong enough to trigger impulsive buying behavior, or that their emotional responses were categorized as low-arousal. When viewed from the perspective of hedonic and utilitarian consumption tendencies, it is also plausible that shoppers prioritized more practical considerations over hedonic impulses.

A related point is that the results show that deal proneness (DP) does not moderate the relationship between positive emotion (PE) and impulse buying (IB), and thus the corresponding hypothesis is also rejected. Instead, the analysis reveals that impulsive buying is directly impacted by deal proneness. This suggests that shoppers' impulsive buying behavior may be shaped more by personal internal tendencies than by situational cues. This conclusion aligns with the findings of Mohan et al. (2012) and Iranmanesh et al. (2017), who reported that deal proneness directly affects impulse buying. Within the framework of the Mehrabian–Russell model, the positive emotions generated from environmental stimuli may not have been strong enough to influence impulsive behavior. Supporting this, Lichtenstein et al. (1990) argued that impulse buying tends to be driven by intrinsic personal factors rather than emotional states alone. Therefore, deal proneness does not significantly moderate the tested relationship but functions as a direct antecedent of impulse buying.

6.2. Theoretical Implications

By analyzing previous studies, in order to build a solid foundation structure for the S-O-R framework. This paper demonstrates that a stimulus does not always generate a significant response through the organism's emotional state. The findings have shown that in-store promotion and store layout as stimuli could influence positive emotion, while employee friendliness does not. However, the positive emotional state of shoppers (organism) is not strong enough to trigger impulse buying decisions as a response. Additionally, the findings conclude that deal proneness does not moderate the relationship between positive emotion and impulse buying, but instead has a direct effect on impulse buying, which later reinforces the distinction between situational emotional factors and personal psychological factors. In other words, personal tendencies have played a more dominant role in influencing impulsive buying behavior compared to short-term emotional reactions triggered by store environment stimuli.

7. CONCLUSION AND FURTHER RESEARCH

In short, by the end of this research, the researchers analyzed and discovered that PE is positively driven by IP and SL, whereas EF fails to exert a meaningful statistical impact. PE does not mediate the effects of IP, SL, and EF on IB, whether or not DP is included as a moderating variable. This study illustrates that a stimulus influencing the organism's emotional state does not necessarily lead to a significant response. This study focuses on the role of environmental stimulus factors within the store (in-store promotion, employee friendliness, and store layout), which further impact customers' emotional states and impulse buying behavior. Meanwhile, psychological factors of a personal nature are only examined through deal proneness. Furthermore, in the near future, it would be more comprehensive if the research could include additional personal psychological variables, such as self-control or materialism. Theoretically, this study has confirmed that psychological traits like deal proneness can override environmental stimuli within the S-O-R model, suggesting that the 'Organism' component is more complex than previously assumed. Managerially, the findings suggest that retail store managers should prioritize clear, attractive price promotions over staff social interaction strategies, since deal proneness has been proven to be the stronger driving force of impulsive buying in this context. Crucially, this study uncovers a theoretical nuance regarding the boundary conditions of the S-O-R framework. As mentioned in prior studies, the traditional model theorized that environmental stimuli (S) must influence internal emotion (O) to drive behavior (R). Therefore, our findings suggest a specific consumer segment called the 'leapfrog effect.' For shoppers with high deal proneness, the cognitive trait appears to dominate the need for emotional mediation. Thus, in this context, deal proneness functions as a psychological shortcut, allowing promotional stimuli to bypass the complex 'Organism' state and directly trigger the impulse buying 'Response.' This implies that in low-involvement settings like retail stores, strong psychological traits can short-circuit the standard thinking process, which later directly leads to making a split-second decision on whether or not to buy promoted items from the store.

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Institutional Review Board Statement: This study was approved by the Research Ethics Committee of Bina Nusantara University, Indonesia under protocol number 051/VRRTT/III/2026. As the study was classified as exempt, electronic informed consent was obtained through the survey platform, and all data were de-identified to ensure respondent anonymity and protect participant confidentiality.

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Data Availability Statement: The corresponding author can provide the supporting data of this study upon a reasonable request.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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