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## OPERATIONS, INFORMATION & TECHNOLOGY | RESEARCH ARTICLE

# Impulse buying during flash sales in the online marketplace

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**Abstract:** Flash sales can be an opportunity for online marketplaces to stimulate impulse buying. This study aims to determine the factors that influence impulse buying from a flash sale in the online marketplace. Stimulus-Organism-Response, Pleasure-Arousal-Dominance and Competitive Arousal Model are used in this study. The study was conducted with 1,093 respondents, and the partial least square structural equation modeling method was used for analysis. Interviews were also conducted to support the research results. The results show that impulse buying was influenced by arousal and pleasure. Limited quantity scarcity and limited time scarcity affect arousal. Information, entertainment, and economic benefits affect arousal and pleasure. The results also show that arousal affects pleasure. Furthermore, attitudes toward flash sales are influenced by information, visuality, entertainment, and economic benefits. This research can provide guidance for online marketplaces in developing flash sale features to increase the chances of impulse buying.

**Subjects:** Internet & Multimedia - Computing & IT; Information & Communication Technology; ICT; Information Technology; Behaviour

**Keywords:** impulse buying; flash sale; marketplace; Indonesia

### ABOUT THE AUTHOR

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### PUBLIC INTEREST STATEMENT

Since 2020, the transaction value in 14 online marketplaces in Indonesia has increased significantly. Customers yet have benefits to shop during flash sales event in the online marketplaces. Flash sales event can be used to increase online product sales resulting in customers' impulse buying. This study analyzes users' behavior that influence impulse buying during a flash sale event in an Indonesian online marketplace. This study uses online questionnaire. The result of the study identifies that impulse buying was influenced by arousal and pleasure. Arousal to make a purchase is influenced by limited quantity scarcity, limited time scarcity, information, entertainment, and economic benefits. Pleasure felt by individuals when participating a flash sale is influenced by information, entertainment, economic benefits, and arousal. At the end, this study is expected to provide guidance for online marketplaces in developing flash sale features to increase the chances of impulse buying.

## 1. Introduction

In 2019, the online marketplace became the online shopping platform with the highest number of transactions worldwide (Statista, 2020). The global rise of online purchases has the potential to increase revenue from this activity to \$5.4 trillion by 2022 (Statista, 2021). Indonesia's e-commerce is one of the largest markets and is growing rapidly worldwide (World Retail Congress, 2019). Sirclo's research (Sirclo, 2019) regarding Indonesian consumers showed that on average, an individual makes purchases 3–5 times a month in the online marketplace, spending 15% of their monthly income. More affordable product offers are one of the main reasons to purchase in the online marketplace (Sirclo, 2019). iPrice data (iPrice, 2021) revealed that online marketplaces frequently visited by Indonesians in the first quarter of 2021 are Tokopedia, Shopee, Bukalapak, Blibli, JD.ID, and Lazada. Based on data from Bank Indonesia, as of November 2020, there was an increase in the transaction value of 14 online marketplaces, which reached 18 billion USD (Pink, 2020).

Flash sales offer products at a lower price than normal for a limited time and at a limited quantity (X. Liu et al., 2021; Zhang et al., 2018b). Several online marketplaces that implement flash sales in their applications are Shopee, Tokopedia, Lazada, and Blibli (Debora, 2018; Fauzi, 2018; Khoirunnisaq, 2021; Ma, 2019). The placement of flash sales on the application's front page is the main attraction of the application itself (Utama & Bestari, 2018). Selling products in the form of flash sales is suitable for individuals who are very price-conscious, and their purchases will only occur when the offer is appealing (X. Liu et al., 2021; Nigam et al., 2020). Flash sales benefit various parties, including buyers, sellers, and online marketplaces (Agrawal & Sareen, 2016; Eisenbeiss et al., 2015). Flash sales can be used to promote and increase product sales because of their ability to attract buyers' attention (Zhang et al., 2018c). In addition, flash sales also benefit online marketplaces because they can increase both the number of visitors and revenue (Agrawal & Sareen, 2016; Sujata & Menachem, 2017).

Selling products online results in impulse buying (Y. Wu et al., 2020). Impulse buying is a purchase that occurs without prior planning or intention and is done suddenly or spontaneously (Verhagen & Van Dolen, 2011). Technology is one aspect that supports impulse buying because of the convenience of applications that can be accessed anytime and anywhere (Akram et al., 2018). Stimuli felt by individuals from various sources can influence impulse buying, so it is necessary to pay attention and determine the right stimulus to obtain a greater chance of impulse buying (X. Liu et al., 2021). Vannisa et al. (2020) showed that limited time and a limited number of products in a flash sale can influence impulse buying. Y. Wu et al. (2020) used the Competitive Arousal Model (CAM) to examine how scarcity or limited promotions affect impulse buying in the online market. Furthermore, Liu et al. (2019) examined the effects of mobile shopping application characteristics on impulse buying using Stimulus-Organism-Response (SOR) and Pleasure-Arousal-Dominance (PAD).

This study was conducted to complement previous research by Liu et al. (2019), Vannisa et al. (2020), Y. Wu et al. (2020), and Vannisa et al. (2020) were more focused on attitude toward flash sales as an internal response of individuals and attitude as the intermediary between limited time and quantity with impulse buying. Impulse buying is more influenced by emotional or affective states (Guo et al., 2017; Verhagen & Van Dolen, 2011). Y. Wu et al. (2020) examined scarcity aspects with the mediation of an emotional state—perceived arousal—but the research focused on the student segment in China within the context of online shopping on e-commerce websites in general. In contrast, this study was conducted with a focus on Indonesian people, and specifically on flash sales. This choice was made in consideration of the possibility of different results with Indonesian people's characteristics and in the context of flash sales. Liu et al. (2019) examined factors that influenced impulse buying only on mobile shopping platforms; these factors can be used in this study to explore more factors that influence impulse buying from flash sales.

This study applied the SOR, PAD, and CAM theories. First, SOR explains that the stimuli felt by an individual from triggers an internal response (organism) that eventually impacts behavior carried

out by the individual (response; Chan et al., 2017). This theory was chosen because it corresponds to the purpose of this study, which is to determine the factors of flash sales (stimulus) that influence impulse buying (response). Therefore, in using SOR theory, affective states represent an organism that is an individual's internal response to stimulus and trigger impulse buying. This theory has previously been widely applied in impulse buying research because of its ability to represent influencing factors and an individual's internal response to these factors, which ultimately affect impulse buying (Chan et al., 2017).

Second, PAD theory explains that a person's when faced with a situation or when receiving a stimulus can be represented by feelings of pleasure, arousal or stimulation, and domination or control (Huang, 2017; Yang et al., 2020). This theory was chosen because it is in accordance with the concept of impulse buying, which is stated to be more influenced by emotional states (Guo et al., 2017; Verhagen & Van Dolen, 2011) so PAD theory is suitable for representing a person's affective states. Third, CAM theory explains that a competitive situation can lead to arousal and impact an individual's behavior (Ku et al., 2005). This theory was chosen because the flash sale characteristics that offer products in limited time and quantity (Nigam et al., 2020) can trigger competition, thus impacting the behavior of impulse buying (Y. Wu et al., 2020). Based on the reasons previously stated, the use of these three theories is expected to help determine impulse buying behavior during flash sales in Indonesia.

The objective of this study is to determine the factors that influence impulse buying in flash sales to help enrich insight and knowledge related to them. This study is expected to be useful and helpful for various parties. Online marketplaces can improve their existing flash sale quality and attract more visitors and buyers. Sellers can also determine sales strategies for flash sales. The central question for our work is: What factors influence impulse buying on flash sale in the online marketplace? Finally, this study can help online marketplaces develop strategies for stimulating buyers to impulse buy and encourage sellers to sell their products on flash sale.

## 2. Literature review and hypothesis

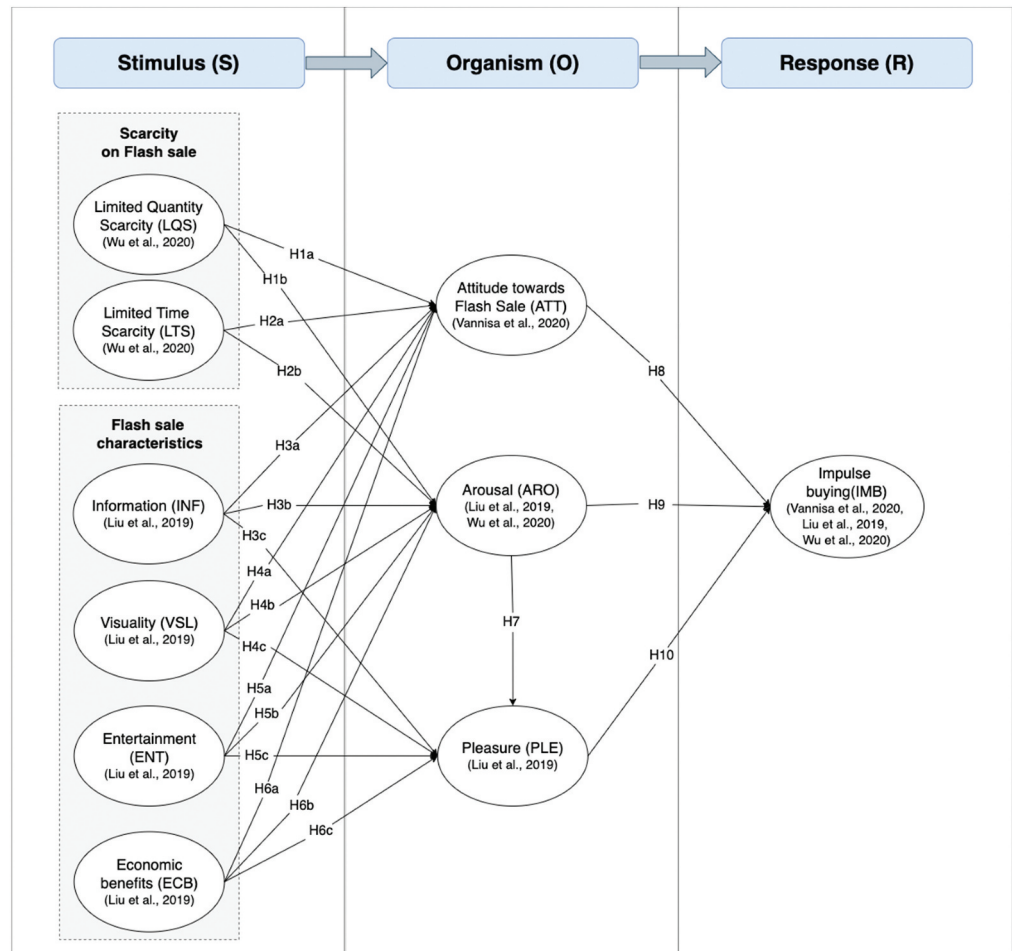
### 2.1. Flash sales

Flash sales are a form of sale that offer products at lower than normal prices in a limited quantity and for a limited time (Gu et al., 2015; Zhang et al., 2018b). In some studies, flash sales are also referred to as daily deals or deals of the day (Shi & Chen, 2015). Flash sales are used as a form of marketing (Priyanka et al., 2019; Zhang et al., 2018c) and promotion (Agrawal & Sareen, 2016; Kukar-Kinney & Xia, 2017; Nigam et al., 2020) or as a business model (X. Liu et al., 2021; Upadhyay et al., 2015). Several online marketplaces that implement flash sales in Indonesia are Shopee, Tokopedia, Lazada, and Blibli (Debora, 2018; Fauzi, 2018; Khoirunnisaa, 2021; Ma, 2019). Flash sales involve products from various sellers of varied types, such as fashion, food, daily necessities, and so on (Shopee, 2021; Tokopedia, 2021a). Flash sales are held at various times; some are held at pointed times, such as National Online Shopping Day, Ramadan, Double Date, and others (Catriona, 2020; Pebrianto, 2020). However, in some online marketplaces, flash sales are held regularly every day and divided into several periods (Shopee, 2021; Tokopedia, 2021b).

### 2.2. Impulse buying

This study focuses on impulse buying in the online context. Compared to offline purchases, people are likelier to buy products impulsively online through various available platforms (Y. Wu et al., 2020). This is due to technological capabilities that allow the shopping process to be easier; it can be done without any time or place restrictions (Akram et al., 2018). Impulse buying can occur because of conditions that influence both an individual's affective and cognitive states (Chan et al., 2017; Liu et al., 2013). These states can be formed from internal or external factors (Iyer et al., 2020). Internal factors refer to individual traits or characteristics, such as impulsive buying tendencies and hedonistic purchase motivations, while external factors are external from individuals, which can be in the form of offers or promotions and shopping media used (Chan et al., 2017). The

Figure 1. Proposed model.



cognitive state is oriented to thinking, understanding, and interpretation, while the affective state is oriented to feelings or emotions (Coley & Burgess, 2003). Although impulse buying is believed to be more influenced by affective than cognitive states (Cakanlar & Nguyen, 2019; Verhagen & Van Dolen, 2011), cognitive states can still play a role in affecting impulse buying (Parboteeah et al., 2009; Sohn & Lee, 2017). Several cognitive and affective states have been used to explain impulse buying, including cognitive states such as perceived risk, perceived informativeness, perceived ease of use, and perceived trust (Chan et al., 2017; Habib & Qayyum, 2018), and affective states such as feeling happy, aroused, and regretful (Sohn & Lee, 2017).

### 2.3. Stimulus-organism-response

The SOR states that the stimulus given from various factors (stimulus) can trigger an individual's internal response to both affective and cognitive states (organism), which eventually impacts an individual's behavior (response; Amirpur & Benlian, 2015; Chan et al., 2017). Stimulus refers to stimuli from various factors, which can be internal or external (Chan et al., 2017). Organism refers to an individual's internal response as a reaction to the received stimuli (Liu & Lu, 2017). In some studies, PAD theory is used to represent the organism (Huang, 2017; Liu et al., 2019) and attitude is also used as an organism's aspect (Kaur et al., 2017; Peng & Kim, 2014; W. Y. Wu et al., 2013). Response is a behavior performed by an individual as a reaction to an internal response (Liu et al., 2019). Several factors have been studied previously as a response, such as purchase intention (Friedrich & Figl, 2018), repurchase intention (Peng & Kim, 2014), and impulse buying (Liu et al., 2019, 2013; Liu & Lu, 2017).

#### **2.4. Pleasure-arousal-dominance**

PAD states that an individual's emotional or affective states can be explained in three ways: pleasure, arousal, and dominance (Huang, 2017; Yang et al., 2020). Individuals will feel one of these three states when faced with a situation or received stimulus (Richins, 1997). Pleasure describes the state of individuals who feel happy, good, and satisfied (Donovan & Rossiter, 1982). Arousal describes the state of individuals who feel aroused, driven, stimulated, excited, and enthusiastic (Donovan & Rossiter, 1982). Dominance describes the state of individuals who feel that they can take control or have the freedom to determine actions (Donovan & Rossiter, 1982).

#### **2.5. Competitive arousal model**

The CAM was proposed by Ku et al. (2005) and explains that people can feel aroused due to factors that trigger competitive situations and that aroused feelings influence behaviors and decisions. Arousal reflects a state of being aroused, driven, stimulated, excited, or enthusiastic (Donovan & Rossiter, 1982). Arousal itself can be seen from two perspectives: excited arousal and competitive arousal (Guo et al., 2017). Excited arousal is an aroused feeling filled with pleasure and enthusiasm, while competitive arousal is an aroused feeling because of competitive situations (Guo et al., 2017). In this theory, the arousal that plays a role is competitive arousal (Guo et al., 2017).

#### **2.6. Research hypothesis**

This study used the SOR, PAD, and CAM theories. The research model was proposed based on selected factors from the research of Vannisa et al. (2020), Y. Wu et al. (2020), and Liu et al. (2019). This model consisted of 10 factors: Limited Quantity Scarcity (LQS), Limited Time Scarcity (LTS), Information (INF), Visuality (VSL), Entertainment (ENT), Economic Benefits (ECB), Arousal (ARO), Pleasure (PLE), Attitude Toward Flash Sale (ATT), and Impulse Buying (IMB). Figure 1 describes the proposed model.

### **3. Research methods**

#### **3.1. Data collection and analysis**

This study used a quantitative approach with online surveys and a qualitative approach with interviews. Because of the COVID-19 pandemic, data collection was carried out online to reach respondents from various regions in Indonesia. Before the questionnaire was filled out by the respondent, a readability test of the questionnaire was conducted to determine whether the respondent could understand the research instruments that had been prepared. The criteria for the readability test respondents were individuals who had purchased products on a flash sale in the online marketplace at least once. Total respondents for the readability test included eight people who met the criteria. Respondents came from various backgrounds, including students, private employees, State-owned Enterprises' employees, and consultants; one of the respondents was a psychology graduate. In general, the results of the readability test were related to the choice of words. Questionnaire links were distributed using various social media (Instagram, Facebook, and Twitter) and chat applications (LINE and Whatsapp). The data collection process was conducted from 22 February 2021, to 25 March 2021 (32 days). To attract people to fill out the questionnaire, a digital wallet balance with a total Indonesia Rupiah of 400,000 was given as a prize for 10 lucky respondents.

In addition, the results of the quantitative analysis were deepened by conducting interviews with 10 respondents who had made purchases in flash sales in the online marketplace. Respondents consisted of five men and five women with an age range of 21 to 46 years. Interviews were conducted online from 1 June 2021, to 8 June 2021.

#### **3.2. Analysis methods**

Partial Least Square Structural Equation Modeling (PLS-SEM) was used as a method because this study specifically examines flash sale characteristics in online marketplaces in Indonesia affecting impulse buying behavior, which has not been done much (explorative research). The application used for data processing with PLS-SEM was Smart PLS 3. IBM SPSS Statistics 25 and Microsoft Excel

**Table 1. Respondents' demographics**

Demographics		Number of Respondents	Percentage
Gender	Women	749	68.53%
	Men	344	31.47%
Age	17–25 years old	771	70.54%
	26–35 years old	222	20.31%
	36–45 years old	66	6.04%
	> 45 years old	34	3.11%
Domicile	Outside Greater Jakarta in Java Island	548	50.14%
	Greater Jakarta	382	34.95%
	Sumatera	106	9.70%
	Kalimantan	32	2.93%
	Bali and Nusa Tenggara	12	1.10%
	Sulawesi	11	1.01%
	Maluku	2	0.18%
Online marketplace that is usually used for purchases on flash sale (can choose more than one option)	Shopee (Flash Sale)	985	90.12%
	Tokopedia (Flash Sale/Kejar Diskon)	387	35.41%
	Lazada (Flash Sale)	204	18.66%
	Bukalapak (Flash Deal)	78	7.14%
	JD.ID (Super Deal)	48	4.39%
	Blibli (Flash Sale)	21	1.92%
	Others	18	1.65%

were also used to assist in data processing. The IBM SPSS Statistics 25 application was used to test outliers and common method bias. Hypothesis testing in this study used a two-tailed test approach.

### 3.3. Research instruments

The questionnaire used in this study consisted of two parts. The first part of the questionnaire consisted of questions regarding the demographics of the respondents and research supporting questions. The questions regarding the demographics of respondents consisted of email address or mobile phone number, gender, age, domicile, education, occupation, and monthly income. Research supporting questions centered on product purchases in flash sales. These questions included online marketplace applications that are usually used to buy products on flash sale, frequency of product purchase transactions on flash sale in one-month, total spending on flash sale purchases in the last three months, products that are usually purchased on flash sale, reasons for purchasing products on flash sale, perceived barriers when purchasing products on flash sale, and hopes for future flash sale development. The second part of the questionnaire consisted of indicators derived from the factors used in this study. Each indicator was assessed using a Likert scale with a value of one (strongly disagree) to five (strongly agree). Appendix A describes the questionnaire research instrument.

## 4. Results

### 4.1. Respondent demographics

The total number of respondents who filled out the questionnaire completely was 1,164. However, only 1,093 respondents had made a flash sale purchase in an online marketplace application. Table 1 provides a summary of the respondents' demographics.



**Table 2. AVE, CR and CA values**

Variable	AVE	CR	CA
ARO	0.836	0.953	0.934
ATT	0.702	0.904	0.858
ECB	0.787	0.937	0.910
ENT	0.827	0.950	0.930
IMB	0.832	0.952	0.933
INF	0.721	0.912	0.871
LQS	0.686	0.867	0.770
LTS	0.717	0.910	0.868
PLE	0.794	0.939	0.910
VSL	0.813	0.946	0.923

#### 4.2. Measurement models

At this stage, the validity and reliability of the outer model were evaluated (Hair et al., 2014). The research model used in this study consisted only of reflective constructs, so the measurement test was conducted only for the reflective ones. Reflective construct measurement tests are divided into validity tests and reliability tests (Hair et al., 2014). The reflective construct validity tests consisted of a convergent validity test and a discriminant validity test (Hair et al., 2014).

The convergent validity test consisted of the loading factor test and the Average Variance Explained (AVE) value test, while the discriminant validity test consisted of the Fornell-Larcker criterion test and cross loading (Hair et al., 2014). This study also used the Heterotrait-Monotrait Ratio (HTMT) for the discriminant validity test (Hair et al., 2019). After conducting a reflective construct validity test, a reflective construct reliability test was conducted. The reflective construct reliability test consisted of testing composite reliability (CR) and Cronbach's alpha (CA) values (Hair et al., 2019). This study met the criteria of the loading factor test, where the value of the loading factor for each indicator was more than 0.7. Table 2 describes the AVE, CR, and CA values.

#### 4.3. Structural model and hypothesis testing

The criteria for acceptance of the two-tailed research hypothesis with a 0.05 significance level is when the P value is < 0.05 and T Statistics are > 1.96. Table 3 shows the results of the hypothesis testing in this study. There are 15 accepted hypotheses and 5 rejected hypotheses.

#### 4.4. Discussion

In this study, limited quantity scarcity was not proven to affect attitudes toward flash sales (H1a), which means that the limited number of products sold in a flash sale does not affect people's attitude toward the flash sale. This is inconsistent with the results of Vannisa et al.'s (2020) research, which stated that products offered in limited quantities on flash sales positively affect attitudes toward the flash sale. Findings in this study indicate that attitudes toward flash sales are not influenced by the limited quantity offered. Based on the interview results, there are several reasons that might support the rejection of this hypothesis. First, selling or offering products in limited quantities is seen as common in both online and offline sales. This reason is supported by six respondents who stated that there are many sales or offers in a limited number of products apart from flash sales, both online and offline.

- "I often find sales in limited quantity of products at the mall." (Respondent 4)
- "Conceptually, flash sale is not the first that implemented sales in limited quantity because this kind of sales have been widely applied in other platforms or stores such as clearance sale." (Respondent 5)

**Table 3. Hypothesis testing result**

Hypothesis		Path Coefficient	T Statistics	P Values	Result
H1a	LQS -> ATT	0.030	1.155	0.248	Rejected
H1b	LQS -> ARO	0.109	3.293	$9.98 \times 10^{-4}$	Accepted
H2a	LTS -> ATT	0.026	1.087	0.277	Rejected
H2b	LTS -> ARO	0.116	3.590	$3.34 \times 10^{-4}$	Accepted
H3a	INF -> ATT	0.085	3.386	$7.14 \times 10^{-4}$	Accepted
H3b	INF -> ARO	0.113	3.447	$5.72 \times 10^{-4}$	Accepted
H3c	INF -> PLE	0.106	3.865	$1.13 \times 10^{-4}$	Accepted
H4a	VSL -> ATT	0.103	3.895	$9.94 \times 10^{-5}$	Accepted
H4b	VSL -> ARO	0.032	0.913	0.361	Rejected
H4c	VSL -> PLE	-0.008	0.257	0.797	Rejected
H5a	ENT -> ATT	0.314	11.891	$5.68 \times 10^{-14}$	Accepted
H5b	ENT -> ARO	0.264	6.644	$3.38 \times 10^{-11}$	Accepted
H5c	ENT -> PLE	0.397	12.669	$5.68 \times 10^{-14}$	Accepted
H6a	ECB -> ATT	0.451	16.660	$5.68 \times 10^{-14}$	Accepted
H6b	ECB -> ARO	0.291	7.818	$5.68 \times 10^{-14}$	Accepted
H6c	ECB -> PLE	0.098	3.647	$2.68 \times 10^{-4}$	Accepted
H7	ARO -> PLE	0.355	10.691	$5.68 \times 10^{-14}$	Accepted
H8	ATT -> IMB	0.058	1.203	0.229	Rejected
H9	ARO -> IMB	0.313	7.013	$2.67 \times 10^{-12}$	Accepted
H10	PLE -> IMB	0.106	2.102	0.036	Accepted

- “I usually find sales with a limited quantity of products at department stores.” (Respondent 6)
- “I have seen a limited quantity sales on application in the form of vouchers.” (Respondent 7)
- “In my opinion, selling products in limited quantity is a common thing to do because many stores or sellers have done those kinds of sales. If it was 2 years ago, those kinds of sales could be new and different.” (Respondent 9)
- “Many stores or sellers sell products in limited quantity with a price that is not too expensive. It is a common thing to do in sales.” (Respondent 10)

Although selling products in limited quantity is seen as a common thing, what distinguishes flash sales in online marketplaces from other sales is information transparency, the variety of products offered even though the quantity is limited, and the ease of obtaining limited products through an application. Second, buyers understand that there are sales or product offerings that are intentionally limited in quantity, and this is reasonable to do. The third reason is that buyers view the products offered in flash sales as neither scarce nor difficult to obtain when the stocks run out, nor as prestige products when they are able to obtain the products from its limited quantity. Respondents said that most of the products offered in flash sales are daily necessities.

Furthermore, limited quantity scarcity was proven to affect arousal (H1b), which means that the limited quantity of products sold in flash sales affects the stimulation and arousal to buy. This result is in line with the findings of Zheng et al. (2013) and Guo et al. (2017), which stated that offering products in limited quantities can stimulate and arouse buyers because it requires them to compete with other buyers to obtain the products. Promotions in limited quantities are considered attractive because not everyone can get them, so they must compete in order not to be preceded by other buyers (Aggarwal et al., 2011). In addition, the acceptance of this



hypothesis is in accordance with the CAM theory used in this study and also previously used by Y. Wu et al. (2020); the limited number of products creates competition between buyers and triggers the urge to win the competition, which is accomplished by successfully obtaining limited products. Competition is also felt by individuals from products offered in limited quantities accompanied by other buyers who show interest in the same product (Ju & Ahn, 2016). Some flash sales in online marketplaces have features that display the number of potential buyers who mark a reminder on products they want before the flash sale begins. That information represents the interest of other potential buyers of the product.

Limited time scarcity was not proven to affect attitudes toward flash sales (H2a). This result is inconsistent with Vannisa et al.'s (2020) research, which showed that the limited time duration of a flash sale positively affects attitudes toward that sale. The findings of this study indicate that attitudes toward flash sales are not influenced by the limited time of sales. Based on the interview results, sales for a limited time is a common thing to do, and various platforms or stores are doing this kind of sales online or offline. People understand that there are some sales that are intentionally done in a limited time duration, especially when it is a promotion that offers products at lower prices. Respondents also stated that they already knew the product offer's schedule before the flash sale started, so there was no problem offering it for a limited time ("It is promotion, so it is normal when it is done in limited time. Sales schedule information is also displayed before the sale starts, as buyers we must monitor it often so we will not miss the chance." Respondent 8).

Products offered in a flash sale are not considered scarce products or difficult to obtain when the time runs out and are not considered prestige products when buyers are able to obtain them in a limited time duration. Respondents stated that most offers in flash sale are repetitive, so they can wait for the next flash sale ("Products offered on flash sale are often repeated so even if you can't get it now, it might be offered again in the next flash sale. If it is like cooking oil or bread, you will be given a cheap promotion because the products will expire, and this kind of promotion will be repeated. It will be different if the product offered is like expensive bags that are intentionally produced in limited stocks." Respondent 2). A total of two respondents also stated that when they are not able to get products on flash sale because the time is limited, the products could still be obtained in other ways ("Most of the products sold in flash sale are common and I do not feel the products are only available in flash sale. I can get the products another time by buying it elsewhere. However, there are some products which are scarce such as t-shirts, but those kinds of products rarely offered on flash sale.", Respondent 5, "If you are not able to get product on flash sale, you still can find the product elsewhere because it is not scarce products or offers." Respondent 4).

Moreover, limited time scarcity influenced arousal (H2b), which means that the limited time offers on flash sale affects stimulation and arousal to buy. This result is consistent with the statement that sales promotions within limited timeframes indicate attractive or profitable promotions that may not exist at other times, so buyers should not miss the opportunity (Eisenbeiss et al., 2015; Mou & Shin, 2018). Limited time promotion has its own attractiveness because it emphasizes promotion that is only available at that time (Mou & Shin, 2018) and buyers tend to feel excited and enthusiastic with limited time promotions (Guo et al., 2017). The feeling of being stimulated or aroused to obtain products can also occur due to concerns about not being able to get the same offer next time (T. Y. Chen et al., 2021). In the context of a flash sale, the products offered might be resold at normal prices or not offered at all after the duration of the sale is over. This result also supports the CAM theory that limited time scarcity triggers a competitive situation and makes buyers feel the time pressure, so they are compelled to make a purchase. Buyers also tend to imagine regret if they miss the opportunity to get attractive offers on a flash sale because they might not be able to get the offers later, so it arouses buyers to make a purchase rather than regret not having made one (Amirpur & Benlian, 2015; Nigam et al., 2020).

Moreover, the product information provided by flash sales affects people's attitude (H3a). This shows that attitudes toward flash sales can be seen from the information provided. The

acceptance of this hypothesis supports the statements of Bebbier et al. (2017) and Akroush and Al-Debei (2015), which indicated that the quality of information forms website image from buyers' and visitors' point of view. Information is considered capable of influencing attitudes toward the shopping platform that is used because it supports purchase decisions (Lim & Ting, 2012). Applications or websites that are able to provide good quality information will be viewed as good platforms, and people will trust (Gao & Wu, 2010) and feel satisfied (Rahul & Aggarwal, 2017) with the platform. This result also supports the statement from R. Wu et al. (2019) that information affects buyers' attitudes and engagement toward applications; good information makes buyers more willing to spend time on applications. The acceptance of this hypothesis is in accordance with previous studies that showed that information affects attitudes toward websites or applications (Chiu & Yang, 2015; Gao & Koufaris, 2006; Gao & Wu, 2010; Hausman & Siekpe, 2009; Lim & Ting, 2012; J. v. Chen et al., 2013).

Additionally, information influenced arousal (H3b), which means that information provided by flash sales affects stimulation and arousal to make purchases. Buyers tend to rely on product information provided by platforms when making online purchases because of their inability to evaluate products directly (physically; Zhou et al., 2018). Product information of good quality can help buyers to imagine the product, so buyers can feel stimulated to buy when imagining the product based on the provided information (W. Zhu et al., 2020). Product information also affects the perception of a product (Q. Wang et al., 2016) and reduces the risks that may occur when making a purchase (Milan et al., 2015; Zhou et al., 2018). In addition to the information provided by sellers, information obtained from other buyers in the form of reviews also plays a role in influencing stimulation to make impulse purchases (K. Z. K. Zhang et al., 2018a). The acceptance of this hypothesis is in accordance with previous studies, which showed that information influenced feelings of arousal and stimulation (Habib & Qayyum, 2018; Liu et al., 2019; Liu & Lu, 2017).

Furthermore, information influenced pleasure, which means that the provided information affects pleasure that is felt when visiting flash sale (H3c). The quality of information provided by a platform plays a role in shaping the shopping experience, thus affecting the pleasure felt when shopping (Liu & Lu, 2017). This result is also in line with the statement that buyers feel happy when visiting a website or application that provides up-to-date product information that is relevant (Loureiro et al., 2020). In addition, individuals also tend to feel happy toward websites or applications that provide informative and useful product information because it helps them to make a purchase decision (R. Wu et al., 2019). Acceptance of this hypothesis is in line with previous studies showing that information affects pleasure (Habib & Qayyum, 2018; Liu & Lu, 2017; B. Liu et al., ; Loureiro et al., 2020; R. Wu et al., 2019).

Visuality influenced attitudes toward flash sales (H4a), which means that interest in a flash sale's visual appearance affects attitudes toward the flash sale. This result is consistent with the statement that visual appearance is one of the things that buyers evaluate when visiting a website or application (B. Zhu et al., 2019) and the impressions of a website or application can be immediately formed upon seeing its visual appearance (Bhandari et al., 2019). In this study, the effects of visuality on attitudes toward flash sales show the most significant and the only accepted hypothesis regarding visuality aspects. Based on this result, the attractiveness of flash sale appearances does inform one's attitude toward the flash sale but does not affect arousal and pleasure. This result is in line with the statement from Bhandari et al. (2019) that the attractiveness and quality of an application can be determined by visual appearances. Trust in a website is also based on visual appearance and attractiveness (Harris & Goode, 2010; B. Zhu et al., 2019), which shows that attitude is influenced by the visual appeal of the appearance.

In this study, visuality was not proven to affect arousal (H4b), which means that an individual's interest in the visual appearance of a flash sale does not affect arousal to make a purchase. This result is inconsistent with previous studies that have proven the influence of visual attractiveness on arousal and stimulation felt by individuals (Liu et al., 2019; Loureiro et al., 2020). Based on the

interview results, the reason that might support this rejection is that an attractive appearance is not the main priority when making purchases in a flash sale because buyers are more focused on obtaining products at low prices. People also said that compared to an attractive appearance, what they really need is a flash sale appearance that is easy to use and not confusing because purchases in flash sales are required to be fast. In addition, attractive appearance is used more to attract people's attention to visit flash sale, and less for encouraging purchases. This reason was stated by four respondents that in the end, the feeling of being aroused to make a purchase is due to the price of the offered product.

- "Although the visual appearance is arranged in such a way, if the price is not cheap, it will not make me compelled to buy." (Respondent 1)
- "Visual appearances don't really arouse me to make a purchase because in the end it is about the offers and products." (Respondent 3)
- "Visual display is more to attract my attention at first but the aroused feeling to make a purchase is more due to product price considerations." (Respondent 5)
- "Attractive appearance is needed so it will be more eye catchy, but an attractive appearance does not arouse me to make a purchase." (Respondent 9)

(1) This study also revealed that visuality was not proven to affect pleasure (H4c), which means that an individual's interest in the visual appearance of a flash sale does not affect their feeling of pleasure. This result is inconsistent with previous studies, which stated that interest in visual appearance has an influence on pleasure (Bhandari et al., 2019; W. K. Chen et al., 2020; W. Y. Wu et al., 2013). Based on the interview results, the attractiveness of a flash sale's visual appearance is not buyers' main priority because they are more focused on obtaining various offers from the flash sale. The results showed that the pleasure felt in a flash sale is due to the offers. In addition, people also said that they are already used to seeing the appearance of flash sales, so the appearance is no longer considered attractive. The results of this study indicated that in the context of a flash sale, an individual's interest in visual appearance only forms attitudes toward the flash sale but does not affect feelings of pleasure or arousal to make purchases.

Entertainment influenced attitudes toward flash sale (H5a), which means that the entertainment experienced when visiting flash sales influences the attitudes toward the flash sale. In other words, the attitude toward a flash sale can be determined by how entertaining the flash sale is. The acceptance of this hypothesis is in accordance with the statement of Upadhyay et al. (2015) that entertainment is one of the flash sale's appeals. This result also supports Fan et al.'s (2013) statement that impressions of an online store can be evaluated by its ability to provide an entertaining shopping experience. This is because online shopping is a way to fulfill hedonic needs, which is to obtain entertainment or enjoyment (Y. J. Wang et al., 2011; Moon et al., 2017). People also tend to visit websites or applications that can provide an entertaining shopping experience (Mazaheri et al., 2011). This is because buyers will not enjoy buying activities that do not make them feel entertained (R. Wu et al., 2019). Satisfaction and trust are also formed in relationship to websites and applications that can entertain their visitors (Gao & Wu, 2010; Sai Vijay et al., 2019). The acceptance of this hypothesis is in accordance with previous studies, which state that the entertainment perceived by individuals from an application or website affects their attitudes toward the website or application (Chiu & Yang, 2015; Lim & Ting, 2012; Mazaheri et al., 2012; Richard & Chebat, 2016).

Furthermore, entertainment influenced arousal (H5b), which means that the entertainment felt when visiting flash sales influences the stimulation and arousal to make a purchase. This result supports previous research conducted by Liu and Lu (2017), which stated that various efforts made by websites or applications with the aim of providing entertainment can stimulate buyers to make purchases. This is because the entertained feeling arouses their enthusiasm, and as a result,

buyers become easily influenced and stimulated to make purchases (Hsieh et al., 2014; Liu et al., 2019). The acceptance of this hypothesis also supports Richard's (2005) research, which stated that people can feel aroused when the website makes them feel entertained, so they become more excited and will find out more about the website. Someone who visits a website or application for entertainment purposes is more likely to make a purchase because of the arousal that arises from feeling entertained (Hsieh et al., 2014). The acceptance of this hypothesis is in line with previous studies, which stated that the feeling of being entertained plays a role in influencing stimulation and arousal to make purchases (Hsieh et al., 2014; Liu et al., 2019; Liu & Lu, 2017).

- (1) In addition, entertainment affected pleasure (H5c), which means that the entertainment felt when visiting a flash sale affects the pleasure feelings. In this study, the relationship between entertainment and pleasure is the more significant when compared to its relationship with attitude and arousal, thus indicating that the feeling of being entertained when visiting a flash sale has the greatest influence on pleasure. Entertainment also has the most significant influence on pleasure compared to information, visuality, and economic benefits. It shows that pleasure in a flash sale is most significantly influenced by how entertaining the shopping experience is in that flash sale. This result supports the statement that online shopping can make individuals feel entertained (Moon et al., 2017), so they will be happy if the platforms are able to entertain them (Liu & Lu, 2017). People who pay more attention to hedonistic aspects tend to make purchases on entertaining platforms to please and satisfy themselves (Ahmad et al., 2019). This result also supports the statement of Liu et al. (2019) that pleasure from a website or application can be measured by how entertaining and enjoyable the shopping experience is. The acceptance of this hypothesis supports previous studies that have stated that entertainment affects pleasure (Liu et al., 2019; Liu & Lu, 2017; R. Wu et al., 2019).

Economic benefits affected attitudes toward flash sales (H6a), which means that the economic benefits offered by flash sales influence attitudes toward flash sales. In other words, attitudes toward flash sales can be seen in the economic benefits offered. In this study, the effect of economic profit on attitudes toward flash sales is a more significant relationship compared to its relationship with arousal and pleasure. In addition, economic benefits have the most significant influence on attitudes toward flash sales compared to information, entertainment, and visuality. This indicates that the economic benefits offered by flash sales have the most significant influence on attitudes toward flash sales. This result is in line with Sinha and Singh's (2017) statement that attitudes toward a website or application are influenced by perceived benefits, and economic factors are one of the benefits. Furthermore, it is also in line with the statement that economic benefits are the reason why people make purchases from flash sales compared to other purchase options (Agrawal & Sareen, 2016; Upadhyay et al., 2015) and flash sales are seen to be more valuable because they have various profitable offers for buyers (Chopdar & Balakrishnan, 2020).

Moreover, economic benefits affected arousal (H6b), which means that the economic benefits offered by flash sales play a role in influencing the stimulation and arousal to make a purchase. Economic benefits have the most significant influence on arousal compared to visuality, information, entertainment, limited time scarcity, and limited quantity scarcity. This indicates that the economic benefits offered by a flash sale have the greatest influence on arousing buyers to make a purchase. This result is in line with Zhou and Gu's (2015), which stated that when people are faced with promotions or discounts, they tend to be more influenced by affective states, one of which is arousal. Individuals also feel excited about various promotions that benefit them economically (Liu et al., 2019). In addition, this result supports the statement of Beurer-Zuellig and Seiler (2017) that people felt the stimulation or arousal to make purchases from a flash sale because it allows them to obtain products at lower prices. When individuals feel that they can obtain products that are cheaper than the expected price, it will arouse them to make a purchase (Yi & Jai, 2020; Zhao & Wan, 2017). In addition, in the context of flash sales, price offers are

limited, so it makes buyers feel aroused to make a purchase before the offers become unavailable or products are offered back to their normal prices (Nigam et al., 2020; Peng et al., 2019).

Economic benefits affected pleasure (H6c), which means that the economic benefits offered by flash sales play a role in influencing the feelings of pleasure felt by an individual. This result supports the statement of Bhattacharya and Anand (2019) that feelings of pleasure are shown from an individual when a product is offered at an attractive price. Pleasure and satisfaction with economically beneficial promotions is felt because it reduces the money that needs to be spent, thus allowing buyers to experience a savings (Chen & Yao, 2018). Individuals will have positive feelings when they realize there is a price reduction from the initial price (e.g., showing a price comparison of before and after reduction; Song et al., 2015). Based on this, it can be said that flash sales that offers products at lower prices than normal prices (Nigam et al., 2020) influence pleasure that is felt as the flash sale is seen as economically profitable. People who tend to look for low-price products will feel happy if they succeed in getting the desired products because it is profitable (Akram et al., 2018). The acceptance of this hypothesis is also consistent with the research conducted by Xu et al. (2020) that there is an influence of economic benefits on the pleasure felt. The acceptance of hypotheses regarding economic benefits (H6a, H6b, H6c) is also supported by demographic data from the respondents: 89.11% of respondents stated the reason for making purchases on flash sale was because it allowed them to get products at affordable prices.

Arousal influenced pleasure (H7), and this hypothesis is one of the significant relationships; it shows that the stimulation and arousal felt when visiting flash sale affects pleasure feelings. This result indicates that these two emotional states are closely related to each other (Liu et al., 2019). This result is also consistent with W. K. Chen et al.'s (2020) research that someone who felt aroused or excited when visiting a website will influence the pleasure that is felt. The feelings of stimulation and excitement can make individuals feel happy with the websites they visit (Hsieh et al., 2014; Loureiro, 2015). People also tend to revisit websites that can make them feel aroused and stimulated because they are happy with the shopping experience (Yang et al., 2020).

Furthermore, attitudes toward flash sales were not proven to affect impulse buying, which means that a person's attitude or view toward flash sales does not affect impulse buying behavior during a flash sale (H8). This result is inconsistent with Vannisa et al.'s (2020) research, which stated that attitudes toward flash sales have a positive influence on impulse buying. Based on the interview results, impulse buying will only happen when buyers feel the urge or are aroused to make a purchase, even if their attitude toward flash sale is good.

This study also shown that arousal affected impulse buying (H9). The influence of arousal on making a purchase is the most significant influence on impulse buying compared to pleasure and attitudes toward flash sales, which indicates that the aroused feeling can affect impulse buying during flash sales. Acceptance of this hypothesis supports the statement that impulse buying is more influenced by emotional or affective states (Guo et al., 2017; Verhagen & Van Dolen, 2011). This result also supports the statement that individuals can make purchases without any prior intention, but because of stimulation or arousal to buy when they see, it (W. K. Chen et al., 2020). This happens due to individuals' inability to hold back and control themselves not to make purchases when they feel aroused, so they make impulse purchases (Ju & Ahn, 2016; Verplanken & Sato, 2011).

Finally, this study found that pleasure affects impulse buying (H10), which means that the pleasure felt when visiting a flash sale influences impulse buying. Acceptance of this hypothesis supports the statement that impulse buying is more influenced by affective states (Guo et al., 2017; Verhagen & Van Dolen, 2011). In addition, this result is also in line with the statement that impulse buying tends to be influenced by an individual's moods (Verplanken & Sato, 2011) and is a buying behavior related to pleasure (W. K. Chen et al., 2020; Santini et al., 2019). The pleasure



feelings entice individuals to find out more about websites or applications they visit, resulting in the possibility of individuals trying products they have never bought and buying them impulsively (Huang, 2017; Lin & Lo, 2015; Richard, 2005; Verhagen & Van Dolen, 2011). Individuals who feel happy tend to behave spontaneously without much consideration, but rather based on feeling (Holland et al., 2012; Shen & Khalifa, 2012). One of the reasons is that people who feel happy tend to do things that can keep them happy, so the chance of impulse buying is greater to make them stay happy (Ju & Ahn, 2016). In addition, people who feel happy tend to be generous; they do not consider many things when making a purchase (Ju & Ahn, 2016). When buyers feel that a purchase can make them feel happy, it will influence them to buy products impulsively as a way of self-indulgence and self-pleasure (Santini et al., 2019).

### 5. Implications

The results of this study confirmed the SOR theory that flash sale factors as stimuli could trigger an individual's internal response as an organism and influence impulse buying behavior as response. These results also confirm the PAD theory that arousal and pleasure represent the affective and emotional states of individuals. In addition, the results also confirmed the statement that impulse buying is more influenced by affective or emotional states because pleasure and arousal have been proven to influence impulse buying in flash sales (Guo et al., 2017; Verhagen & Van Dolen, 2011). Furthermore, this study also confirmed the CAM theory that a competitive situation formed from limited quantity scarcity and limited time scarcity was able to influence arousal to buy and lead to impulse buying.

The results of this study also confirmed the research of Y. Wu et al. (2020), which stated that limited time scarcity and limited quantity scarcity affect arousal and eventually impact impulse buying. Furthermore, this study confirmed most of the research from Liu et al. (2019). Information, entertainment, and economic benefits have been proven to influence pleasure and arousal. Arousal was proven to influence pleasure, and impulse buying was also proven to be influenced by arousal and pleasure. Visuality was not proven to influence pleasure and arousal because visual appeal is not the buyers' priority when purchasing products in a flash sale. Compared to an attractive visual appearance, buyers prefer the visual appearance of flash sale to be easy to use and not confusing.

The results in this study also did not confirm the relationship between limited time, limited quantity, attitude toward flash sale, and impulse buying from the research of Vannisa et al. (2020). In this study, limited quantity and limited time were not proven to influence attitudes toward flash sales because selling products in a limited time or quantity is considered normal, and buyers understand that some stores or platforms are intentionally selling products in limited availability. Furthermore, most of the products sold during flash sales are not considered scarce or hard to get when time or stock run out and are not considered prestige products, so they do not influence attitudes toward flash sales. Attitudes toward flash sales were not proven to influence impulse buying because, in the end, individuals will impulse buy when they feel aroused or stimulated to buy, regardless of their good attitude toward flash sale.

Impulse buying is influenced significantly by arousal and pleasure. Online marketplaces can focus on factors that influence both. Limited time and number of products offered during a flash sale affect the aroused feeling to make a purchase. Information, entertaining shopping experiences, and economic benefits of flash sales affect arousal and pleasure. Attitude toward a flash sale does not affect impulse buying. However, to give buyers a good impression of flash sales, it is necessary to pay attention to aspects that influence the attitude, which are information, visuality, economic benefits, and entertainment. In addition, based on the data obtained in this study, respondents expressed their hopes for a flash sale that is free from bots and fraud and does not have any technical problems. System infrastructure improvement is needed so flash sales can run smoothly and ensure that the system is free from any fraud. Other hopes for flash sale development are the addition of a product recommendation feature, a sorting by price feature, a popularly



purchased product feature, and the improvement of product categorization and reminder features.

## 6. Conclusion

Impulse buying during flash sales is most significantly influenced by arousal to make a purchase and is followed by pleasure. Attitudes toward flash sales do not affect impulse buying. Arousal to make a purchase is influenced by limited quantity scarcity, limited time scarcity, information, entertainment, and economic benefits. Pleasure felt by individuals when visiting a flash sale is influenced by information, entertainment, economic benefits, and arousal. Visuality of flash sale does not influence arousal or pleasure. Attitudes toward flash sales are influenced by information, visuality, entertainment, and economic benefits.

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## Appendix A. Research Instruments

Code	Statements
LQS1	I feel the products and the number of stocks for each product available in the flash sale is limited.
LQS2	I feel that the products I am interested in flash sale are usually sold out quickly.
LQS3	I am worried about the number of products that are limited on the flash sale.
LQS4	I feel that the products I want on flash sale are often rarely available.
LTS1	I feel the time available for shopping during flash sale is limited.
LTS2	I realize that the sales duration during flash sale do not last long.
LTS3	When I shop on flash sale, I am worried about the remaining time to shop.
LTS4	I feel the duration of flash sale ends quickly.
INF1	Flash sale provides product information that is relevant to what I need.
INF2	Flash sale provides sufficient product information.
INF3	Flash sale provides accurate product information.
INF4	Flash sale provides the latest product information.
VSL1	I find flash sale is visually attractive.
VSL2	I find the way flash sale displays the product information is attractive.
VSL3	I find the overall look and feel of flash sale is visually appealing.
VSL4	I like visual appearances of flash sale.
ENT1	I find it fun to see products on flash sale.
ENT2	I find flash sale is entertaining.
ENT3	I find flash sale is exciting.
ENT4	I find flash sale is interesting/attractive.
ECB1	I can get products at affordable price on flash sale.
ECB2	I can buy products at cheaper price on flash sale compared to other options.
ECB3	Flash sale allows me to save money spent on buying products.
ECB4	Buying products on flash sale benefits me financially.
ATT1	I like flash sale offers.
ATT2	I enjoy flash sale.
ATT3	I find that flash sale makes my life easier in getting products at low prices.
ATT4	In general, I support flash sale.

(Continued)

(Continued)	
Code	Statements
ARO1	Flash sale makes me feel stimulated to buy the product.
ARO2	Flash sale makes me feel very excited to buy the product.
ARO3	Flash sale makes me feel aroused to buy the product.
ARO4	Flash sale makes me feel enthusiastic to buy the product.
PLE1	Flash sale makes me feel happy.
PLE2	Flash sale makes me feel satisfied.
PLE3	Flash sale makes me feel pleased/good.
PLE4	Flash sale makes me feel less frustrated.
IMB1	I usually buy products on flash sale spontaneously.
IMB2	The products I bought on flash sale are mostly unplanned.
IMB3	I bought product on flash sale that I did not initially want to buy it.
IMB4	I ended up buying the product on flash sale even though I did not initially intend to buy.



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