

Scarcity effect on impulse buying: The mediating role of arousal

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ARTICLE INFORMATION

Article History

Received: 27-12-2024

Revised: 04-02-2025

Accepted: 05-02-2025

Keywords

Scarcity;

Arousal;

Turnover Intention.

ABSTRACT

E-commerce, especially in Southeast Asia, is experiencing rapid growth, and flash sales are a powerful way to boost online shopping. They use scarcity (limited time or quantity) to create impulse buying. This research investigates the scarcity effect on online impulse buying through arousal as the mediating variable in e-commerce. This study was conducted on those who have experience shopping online through various e-commerce platforms. Using convenience sampling techniques, this study covered 225 respondents. Data was collected from October to November 2024 using an online questionnaire, namely Google form, WhatsApp private groups, and anWhatsAppram direct message distributed. This study used a quantitative analysis approach to achieve its objectives. The inferential analysis technique examines the nature of the hypothesized relationships between variables. Data is processed and analyzed by 2-stage regression through IBM SPSS Statistics 23. Meanwhile, the mediating variables were tested using the Sobel test and Daniel Sober Calculator. This study found that Limited-Time Scarcity significantly impacts arousal, but Limited-Quantity scarcity does not. Interestingly, only arousal had a significant direct impact on Impulse Buying, not the Scarcity factors. Additionally, the study revealed that arousal partially mediates limited-time Scarcity on Impulse Buying, but it doesn't mediate limited-quantity scarcity on Impulse Buying. This findings limitation is that the respondent's domicile is mainly in Semarang. Therefore, future research should explore other Indonesian cities. This findings implications is that e-commerce must focus on the limited time for their promotion events to arouse customers so that they can impulsively buy.

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1. Introduction

As of 2024, e-commerce globally contributes the largest share of online purchases. Indonesia will also be the most prominent e-commerce in Southeast Asia, valued at 82 billion US dollars (Statista, 2024). This means that e-commerce users are increasing rapidly in Indonesia. Many people choose e-commerce to fulfill their needs and wants. E-commerce provides complete information and reviews of products that we want to buy. E-commerce also provides many discounts and sales that attract consumers to make purchases directly on e-commerce (Jarti et al., 2023). Therefore, e-commerce users like to purchase from e-commerce because they have a great experience, especially with flash sales (Lamis et al., 2022). Flash sales are one of the most effective e-commerce strategies for increasing purchases. Flash sales can also trigger someone to buy immediate purchases (Martaleni et al., 2022). A flash sale is a strategy where businesses sell their products in scarcity, including limited quantity and limited time scarcity (Fathia & Vania, 2023).

Scarcity refers to a limit of resources or a commodity that can arise when human needs and wants exceed the availability of resources (Suparmono, 2018). Scarcity includes limited time and limited quantity, which can affect consumers' emotions and prompt them to buy things immediately because they are afraid of running out of stock and have a chance to buy before they get to a regular price (Cengiz & Senel, 2024).

Arousal is a psychological situation marked by increasing happiness or anticipation, which significantly influences consumer decision-making, especially during flash sales; the combination of limited quantity scarcity and limited time scarcity can create arousal that creates impulse buying (Wu et al., 2021). Arousal is crucial in prompting impulsive purchases during flash sales in e-commerce (Fathia & Vania, 2023). We know that the growth of e-commerce can change consumer behavior. Therefore, consumers like to search for sales and try to get a product at the best price, even if they have to compete to achieve it. This shows that flash sales that provide limited products and limited time can impact consumer emotions, where they are aroused to make immediate purchases (impulse buying), particularly on e-commerce. Therefore, e-commerce uses a limitation strategy in flash sales to provoke consumer emotions so that they feel that this is their chance to buy at a lower price with a limited quantity.

This study was conducted to complement previous studies by Cengiz and Senel (2024), Martaleni et al. (2022), and Sun et al. (2023). Previous studies have discussed scarcity and impulse buying; however, only a few have explored the mediating role of arousal in this relationship, especially in the context of general e-commerce in Indonesia. Cengiz and Senel (2024) focused on the perceived scarcity of impulse buying in a fast fashion context. This study did not discuss arousal as a mediating factor. In contrast, Sun et al. (2023) focused on the relationship between limited time and impulse buying in live streaming e-commerce, primarily relying on the Credamo platform. Martaleni et al. (2022) discuss flash sales and online impulse buying mediated by emotion in e-commerce focusing on the shopee platform.

We chose to discuss e-commerce in general because it is more widely applicable to all platforms. Research on a single platform might only be relevant to users of that specific site, whereas general findings can inform our understanding of online shopping behavior across different platforms (Lamis et al., 2022). This research can help marketers, especially in Indonesia, refine their strategies to better harness the psychological mechanisms driving impulse purchases. In this study, we want to discuss about "How does arousal mediate the relationship between Scarcity and Impulse buying in e-commerce?" This study aims to understand the effects of Limited Quantity Scarcity and Limited Time Scarcity on Impulse Buying. This study also aims to explore the mediating role of arousal in e-commerce. This

study provides new knowledge for previous and future researchers that arousal can be an important factor in creating strategies.

2. Literatur Review and Hypothesis Development

2.1. Literatur Review

2.1.1. Consumer Behaviour

Consumer behavior is the study of how individuals, groups, or organizations select, purchase, use, and discard goods, services, ideas, or experiences to satisfy their desires (Razak, 2016). Consumer behavior involves obtaining goods and services, including decision-making processes that create successful outcomes (Rodrigues et al., 2021). This includes several factors, including psychological, social, cultural, and economic impacts. Consumer behavior refers to an activity in which the chance to accomplish goods and services consists of the decision-making process that precedes and makes that activity successful (Rodrigues et al., 2021). Factors that impact consumer behavior are divided into external and internal factors. External factors include culture and subcultures, social class, reference groups, and situations. Internal factors include consumer perception, awareness, motivation and affection, self-identity, lifestyles, and values (Solomon, 2020).

2.1.2. E-commerce

E-commerce involves the buying and selling of goods online. This involves the use of electronic communication and information exchange in digital transactions (Jarti et al., 2023). E-commerce includes online shopping, digital payments, and digital marketing (Laudon & Traver, 2021). One of Shopee's digital marketing strategies is flash sales. Flash sales are marked by a limited-time discount and limited stock that create urgency to buy, and scarcity can create an arousal feeling that pushes the sales (Lamis et al., 2022).

2.1.3. Scarcity

Scarcity refers to a limit of resources or a commodity that can arise when human needs and wants exceed the availability of resources (Suparmono, 2018). In marketing, limited-time offers and limited-quantity availability can create a sense of scarcity. Limited-time scarcity is defined as a consumer's perception of a product or service available for a limited period, which can create urgency to make an immediate purchase. A limited quantity is a product available in limited numbers (Solomon 2020). Flash sales are marked by a limited-time discount and limited stock that create urgency to buy, and scarcity can create an arousal feeling that pushes the sales (Lamis et al., 2022). Research shows that scarcity, including limited time and quantity, can significantly impact impulse buying (Cengiz & Senel, 2024).

2.1.4. Arousal

Arousal is a psychological and physiological state when something triggers and creates a stimuli reaction (Solomon, 2020). Factors that impact arousal include physiological factors, such as hormones (e.g., adrenaline and cortisol); psychological factors, including interest and motivation; environmental factors, such as sensory input; and social factors, including cultural factors. Other factors that impact arousal include stimulation, excitement, arousal, and enthusiasm (Lamis et al., 2022).

2.1.5. Impulse Buying

Impulse Buying is an unplanned purchase that occurs when someone faces several stimuli. This unplanned buying includes planning and new purchases, contrary to usual purchases (Abdelsalam et al., 2020). Impulse Buying can be defined as purchasing something that is out of plan and is usually driven by emotion, wants, or essential needs without any good decision-making (Solomon, 2020). Factors that impact impulse buying include traits (love sensation), motives (utilitarian, hedonic), consumer resources (time and money), and marketing stimulation that triggers impulse buying (Iyer et al., 2020). Factors that impact impulse buying include emotional factors, such as positive and negative emotions. Positive emotions, such as excitement and satisfaction, and negative emotions, such as stress, were also considered. Situational factors include store layout, limited-time discount offers, and peer pressure. The third factor is product factors, such as new products and attractive packaging. The last factor is personal traits and cognition (Solomon, 2020). Other impulse-buying factors include spontaneous feelings that they do not initially intend to buy (Akram et al., 2018). When consumers face flash sales, the combination of limited quantity scarcity and limited time scarcity can create arousal that leads to impulse buying (Wu et al., 2021). Research indicates that arousal is crucial in prompting impulsive purchases during flash sales (Lamis et al., 2022). Flash Sales might increase brand awareness and push traffic to create more business revenue. However, it is essential to note that while flash sales can effectively boost sales, they can devalue a brand if they are used too frequently or without proper planning.

2.2. Hypothesis Development

2.2.1. Positive Effect of Limited Quantity Scarcity on Arousal

Limited quantity scarcity is restricted to the units of a product. First-come and first-served promotions create competition and uncertainty around limited-quantity sales (Wu et al., 2021) Limited Quantity Scarcity forces consumers to compete with one another by supplying a small number of products that can arouse someone's emotions (Fathia & Vania, 2023). The limited number of products sold in flash sales can entice consumers to buy them (Lamis et al., 2022). Limited products can create a state of anxiety and even panic, as people worry about being left behind (Lianjie et al., 2023). The perception of a limited item can create psychological pressure on consumers (Serravalle et al., 2023). As a result, a limited quantity can arouse consumers to compete with one another to buy the product.

H₁: Limited Quantity Scarcity Has a Positive Effect on Arousal

2.2.2. Positive Effect of Limited Time Scarcity on Arousal

Limited-time scarcity is defined as a consumer's perception of a product or service available for a limited period, which can create urgency to make an immediate purchase. Limited time scarcity can affect consumer behavior, activating higher perceived competition (Broeder & Wentink, 2022). Another study concluded that the shorter the time given, the more pressure the customer feels (Sun et al., 2023). Limited Time Scarcity can encourage consumers to make purchases (Fathia & Vania, 2023). Limited time can also stimulate emotions (Ogden et al., 2019). Limited time pressure can create a state of anxiety and even panic, as people worry about missing out (Lianjie et al., 2023). As a result, limited Time Scarcity can pressure consumers to compete with one another to buy the product.

H₂: Limited Time Scarcity Has a Positive Effect on Arousal

2.2.3. Positive Effect of Limited Quantity Scarcity on Impulse Buying

Limited Quantity Scarcity refers to the number of available units that decrease by one when a consumer purchases one. This limitation creates a sense of urgency to buy directly without any plan (Lamis et al., 2022). Impulse Buying is an unplanned purchase that occurs when someone faces several stimuli, such as limited product availability (Sugla & Sen, 2023). Limited product availability can foster feelings of exclusivity and uniqueness, leading to impulsive purchases as individuals strive to maintain a sense of self-determination and capability (Cengiz & Senel, 2024). Limited product offers can drive consumer sensitivity, leading to impulsive purchases (Dahmiri et al., 2023). Limited product messages can amplify impulsive buying behavior (Guo et al., 2017). As a result, limited products can lead someone to buy impulsively because they want to be more exclusive and different from one another.

H₃: Limited Quantity Scarcity Has a Positive Effect on Impulse Buying

2.2.4. Positive Effect of Limited Time Scarcity on Impulse Buying

Limited-time scarcity is defined as a consumer's perception of a product or service available for a limited period, which can create urgency to make an immediate purchase (Solomon, 2020). Impulse buying is defined as immediately purchasing something without any plan. Therefore, limited time can affect impulse buying (Lamis et al., 2022). Limited time can also lead consumers to buy things directly at a time without any plans (Sun et al., 2023). Attractive sales, such as flash sales with time pressure, can lead consumers to impulse buying (Sugla & Sen, 2023). Time-based scarcity can drive impulsive buying behavior (Guo et al., 2017). The sight of time-sensitive offers can drive impulsive buying behavior because consumers fear missing out on limited deals (Dahmiri et al., 2023). The pressure of a limited-time offer can trigger impulsive purchases because consumers fear missing out on a deal they believe may not be repeated.

H₄: Limited Time Scarcity Has a Positive Effect on Impulse Buying

2.2.5. Positive Effect of Arousal on Impulse Buying

Arousal is a physiological state marked by increasing happiness or anticipation, which significantly influences consumer decision-making (Wu et al., 2021). Emotions can prompt someone to buy things immediately because they are afraid of missing out on sales (Sugla & Sen, 2023). Flash sales can create a sense of urgency for someone to make a purchase at a moment without any (Lamis et al., 2022). Impulse buying occurs when someone can make a fast decision to buy things (Sun et al., 2023). The excitement and stimulation generated by certain marketing tactics can create a state of arousal, fostering impulsive purchase decisions (Feng et al., 2024). A sense of urgency can fuel impulsive purchases (Guo et al., 2017). As a result, impulse buying is influenced by emotions that make someone interested and enthusiastic about making a purchase.

H₅: Arousal Has a Positive Effect on Impulse Buying

2.2.6. The Mediating Role of Arousal on The Effect of Limited Quantity Scarcity on Impulse Buying

First-come, first-served promotions create competition and uncertainty around limited-quantity sales (Wu et al., 2021). Limited product availability can foster feelings of exclusivity and uniqueness, leading to impulsive purchases as individuals strive to maintain a sense of self-determination and capability (Cengiz & Senel, 2024). Limited stock availability encourages consumers to make impulsive purchases due to perceived

3. Research Method

3.1. Population and Sampling Method

The population of this study was Indonesian people of all ages living on the island of Java. The study was conducted on those who have experience shopping online through various e-commerce platforms. Using purposive sampling techniques, this study covered 225 respondents. Data were collected from October to November 2024 using an online questionnaire, namely Google form, that WhatsApp private groups and WhatsApp direct messages were distributed. We chose this method because we specifically targeted a certain segment of the population (those with online shopping experience) rather than trying to get a representative sample of all Indonesian people on Java. We attempted to understand the online shopping behavior of those who have already engaged in it.

3.2. Data Collecting Method

We used a questionnaire to obtain data from the respondents. The instrument used to validate the proposed model consisted of eight items. Ten items on the variable Scarcity (Sun et al., 2023) (modified), seven items on the variable Arousal (Fathia & Vania, 2023), and four items on the variable Impulse Buying (Akram et al., 2018) (modified) were included. Perceptual data were quantified using a 4-point Likert scale (strongly disagree, disagree, agree, and strongly agree). This study used a quantitative analysis approach to achieve its objectives. The inferential analysis technique examines the nature of the hypothesized relationships between variables.

3.3. Data Analysis Method

Validity and reliability tests were an important stage before we processed and analyzed our data. To determine the validity of each statement, we calculated the correlation between its individual score and the total score using the corrected item-total correlation method. We compared the r-count and r-table to analyze the validity test results. The formula for the r-table is $df = n - 1 = 225 - 1 = 224$, so $r\text{-table} = 0.195$. Reliability testing, often assessed using Cronbach's alpha, indicates that a test with a value greater than 0.6 is considered reliable (Rahmadhon et al., 2024). Data were processed and analyzed a 2-stage regression through IBM SPSS Statistics 23. Hypothesis testing involved comparing significance levels. A significance value smaller than this level indicates support for the hypothesis. If the significance value is less than 0.05, the hypothesis was accepted. The mediating variables were tested using the Daniel Sober Calculator. The Sobel test was employed to evaluate the significance of the mediating variable's role in the relationship between the independent and dependent variables (Gorondutse & Hilman, 2014). A calculated z-value greater than 1.96 indicates a significant mediating effect.

4. Results and Discussion

4.1. Characteristics of Respondents

The total number of respondents was 225 from various educational occupations and domiciles. Most respondents' latest education was senior high school, and most were students, with 108 respondents. Women comprised the majority of respondents, with 153 respondents. The majority were 15-25 years old, with 129 respondents. They mainly live in Central Java, focusing on Semarang, with 207 respondents. Most of their monthly income was over Rp 4.000.000, with 90 respondents reporting this. Shopee is the most popular e-commerce site, with 203 respondents. Most respondents bought 1-2 times per month, with 120 respondents. Lastly, their average spending per transaction was Rp50.000 - Rp100.000 with 119 respondents.

4.2. Validity Test

Convergent validity testing measures the correlation between a construct and its latent variable by examining the loading factor values. If the loading factor value is greater than 0.6, the research is considered valid (Yamato et al., 2017). Table 1 shows that each indicator is valid.

Table 1. Validity Test Result

Indicator	Scarcity	Arousal	Impulse Buying
Limited Time Scarcity (1)	0.681		
Limited Time Scarcity (2)	0.651		
Limited Time Scarcity (3)	0.705		
Limited Time Scarcity (4)	0.688		
Limited Time Scarcity (5)	0.634		
Limited Time Scarcity (6)	0.628		
Limited Quantity Scarcity (1)	0.710		
Limited Quantity Scarcity (2)	0.681		
Limited Quantity Scarcity (3)	0.645		
Limited Quantity Scarcity (4)	0.673		
Stimulated (1)		0.670	
Stimulated (2)		0.605	
Excited (1)		0.696	
Excited (2)		0.785	
Aroused (1)		0.662	
Aroused (2)		0.838	
Enthusiastic (1)		0.846	
Spontantiously (1)			0.797
Spontantiously (2)			0.777
Not intially intend to buy (1)			0.886
Not intially intend to buy (2)			0.880

Source: Primary Data Processed (2025)

4.3. Reliability Test

Table 2 shows the reliability results for all variables in this study. The results indicated that scarcity as the independent variable was reliable, with a Cronbach's alpha of 0.784. Arousal was the mediating variable with Cronbach's alpha 0.881, and impulse buying was the dependent variable with Cronbach's alpha 0.855.

Table 2. Reliability Test Results

Variable	Cronbach's Alpha
Scarcity	0.784
Arousal	0.881
Impulse Buying	0.855

Source: Primary Data Processed (2025)

4.4. Hypothesis Test

Table 3 presents the hypothesis test results using SPSS with 2-stage regression. The first stage of the regression. This shows that the first hypothesis is rejected. Limited quantity scarcity does not positively affect arousal because the significance value is 0.143. Next, the limited time scarcity effect positively affected arousal because the significance value was 0.000, which is less than 0.05. this supports the second hypothesis 2. Limited quantity scarcity does not positively affect impulse buying because the significance value is

0.575, which doesn't support third hypothesis. Limited time scarcity does not positively affect impulse buying because the significance value is 0.185, which does not support the fourth hypothesis. Finally, arousal affect positively affects impulse buying because the significance value is 0.000, which supports the fifth hypothesis.

Table 3. Hypothesis Test Result

Hypothesis	B	Std. Error	Beta	t	Sig.
Limited Quantity Scarcity → Arousal	0.130	0.088	0.110	1.470	0.143
Limited Time Scarcity → Arousal	0.961	0.122	0.590	7.883	0.000
Limited Quantity Scarcity → Impulse Buying	0.600	0.106	0.050	0.561	0.575
Limited Time Scarcity → Impulse Buying	0.215	0.161	0.131	1.131	0.185
Arousal → Impulse Buying	0.412	0.083	0.412	5.050	0.000

Source: Primary Data Processed (2025)

4.5. Sobel Test

After analyzing the data with 2-stage regression through SPSS, we obtained some numbers that we can use to calculate the mediating relationship. We used the beta and standard error numbers to calculate the Sobel test. The mediating effect of arousal between limited quality scarcity and impulse buying was examined using the Sobel test. Table 4 shows that arousal does not mediate the effect of limited quantity scarcity on impulse buying (z score $1.212 < 1.96$). Next, the mediating effect of arousal between limited time scarcity and impulse buying was examined using the Sobel test. Arousal partially mediates the effect of limited time scarcity on impulse buying (z score $3.463 > 1.96$).

Table 4. Sobel Test Results

Hypothesis	Z Score
Limited Quantity Scarcity → Arousal → Impulse Buying	1.212
Limited Time Scarcity → Arousal → Impulse Buying	3.463

Source: Primary Data Processed (2025)

4.5. Discussion

4.4.1. The Effect of Perceived Limited Quantity Scarcity on Arousal

Limited quantity scarcity does not have a positive effect on arousal. These findings align with the research of Martaleni et al. (2022), who found that scarcity does not positively affect impulse buying. Thus, scarcity strongly influences consumer arousal. These findings contradict those of Lamis et al. (2022), who found that limited quantity scarcity affects impulse buying. Lianjie et al. (2023) contradicts this study, stating that limited products can create a state of anxiety and even panic, as people worry about being left behind. Serravalle et al. (2023) also stated that the perception of limited items can create psychological pressure on consumers. These findings contradict the theory proposed by Solomon (2020), which states that arousal is a psychological and physiological state when something is triggered and creates a stimuli reaction. However, this research shows that a limited quantity does not positively affect arousal because people might think that the limited product does not trigger their

emotions.

4.4.2. The Effect of Limited Time Scarcity on Arousal

The limited time scarcity effect positively affects arousal. These findings align with the research of Martaleni et al. (2022), who found that scarcity does not positively affect impulse buying. According to Odgen et al. (2019), scarcity strongly influences consumer arousal, but they do not purchase goods. Limited time can also stimulate emotions. Lianjie et al. (2023) also stated that pressure in limited time can create a state of anxiety and even panic, as people worry about missing out. These findings also align with those of Lamis et al. (2022), who found that limited time scarcity affects impulse buying. Scarcity makes people feel fear of missing out on the limited time given to them. These findings align with the theory proposed by Solomon (2020), which states that arousal is a psychological and physiological state when something triggers and creates a stimuli reaction. This study shows that limited time can trigger and stimulate consumers. This research shows that limited time scarcity positively affects arousal because time pressure triggers emotions and creates stimuli reactions.

4.4.3. The Effect of Limited Quantity Scarcity on Impulse Buying

Limited quantity scarcity does not have a positive effect on impulse buying. This result aligns with the findings of Fathia and Vania (2023), who found that limited quantity does not positively affect impulse buying. These findings contradict the research of Sun et al. (2023), who found that a limited quantity can positively affect impulse buying because it fosters a sense of urgency and exclusivity of someone's emotions. These findings contradict the theory proposed by Abdelsalam et al. (2020), which states that impulse buying is an unplanned purchase that occurs when someone faces several stimuli. Dahmiri et al. (2023) stated that limited product offers can drives consumers sensitivity that lead them to make impulsive purchases. Guo et al. (2017) also stated that limited product messages can amplify impulsive buying behavior. However, this study shows that a limited quantity is not enough to stimulate impulsive purchases. However, this study shows that a limited product does not positively affect impulse buying because consumers do not feel several stimuli that move their emotions to impulsively buy that product.

4.4.4. The Effect of Limited Time Scarcity on Impulse Buying

Limited time scarcity does not have a positive effect on impulse buying. These findings contradict the research of Sun et al. (2023), who found that limited time can positively affect impulse buying. However, the difference between our study and theirs is that they are more focused on live streaming. However, this finding contradicts the research of Cengiz and Senel (2023), who found that scarcity does not positively affect impulse buying because it focuses on the fashion context. These findings contradict the theory proposed by Abdelsalam et al. (2020), which states that impulse buying is an unplanned purchase that occurs when someone faces several stimuli. Guo et al. (2017) stated that scarcity based on time can drive impulsive buying behaviors. Dahmiri et al. (2023) also stated that the sight of time-sensitive offers can drive impulsive buying behavior because consumers fear missing out on limited deals (Dahmiri et al., 2023). However, this study shows that a limited time is not enough to stimulate impulsive purchases. This research shows that limited products do not positively affect impulse buying because they do not feel several stimuli that move their emotions to impulsively buy that product.

4.4.5. The Effect of Arousal on Impulse Buying

Arousal effects are positive on impulse buying. These findings align with those of Martaleni et al. (2022), who found that arousal has a positive effect on impulse buying. Consumers find flash sales activities and strategies pleasurable and intriguing but also experience fear and anxiety about them. These emotions can lead to impulsive shopping. These findings also align with the research of Sun et al. (2023), which found that arousal can affect impulse buying. When consumers feel excited about flash sales, they can impulsively make purchases. Feng et al. (2024) state that the excitement and stimulation generated by certain marketing tactics can create a state of arousal, fostering impulsive purchasing decisions. Guo et al (2017) also stated that a sense of urgency of someone can fuel impulsive purchases. These findings align with Solomon (2020) stated that impulse buying can be defined as purchasing something that is out of plan and is usually driven by emotion, wants, or essential needs without any good decision making. This study shows that definitive arousal can drive consumers to impulsively purchase things. This study shows that arousal has a positive effect on impulse buying, and that e-commerce must create more interesting events of flash sales that can touch customer emotions so that they can impulsively make a purchase.

4.4.6. The Effect of Limited Quantity Scarcity on Impulse Buying Mediated by Job Arousal

Arousal does not mediate the effect of limited quantity scarcity on impulse buying. This result partially aligns with the findings of Fathia and Vania (2023), who found that arousal partially mediates the effect of limited quantity scarcity on impulse buying. This result contradicts the findings of Wu et al. (2021), who found that arousal mediates the effect of limited quantity scarcity on impulse buying. Therefore, Feng et al. (2024) stated that the perception of limited supply or availability can induce a sense of urgency in consumers, resulting in impulsive purchasing decisions to avoid potential losses (Feng et al., 2024). Serravalle et al. (2017) also stated that product scarcity can create psychological pressure on consumers (Serravalle et al., 2023). These findings contradict Solomon (2020) stated that impulse buying can be defined as purchasing something that is out of plan and is usually driven by emotions, wants, or essential needs without any good decision-making. However, this study shows that limited items do not encourage consumers to buy things immediately. As we discussed in the previous results from the first to the fifth hypothesis, we can conclude that e-commerce must create more interesting (not only provide a limited product), but e-commerce can pick a viral product that is desired by many people so that the flash sales event can arouse consumer emotion to create impulse buying.

4.4.7. The Effect of Limited Time Scarcity on Impulse Buying Mediated by Job Arousal

Arousal mediates the effect of limited time scarcity on impulse buying. This result partially aligns with the findings of Fathia and Vania (2023), who found that arousal partially mediates the effect of limited time scarcity on impulse buying. The same result was obtained by Wu et al. (2021), who found that arousal partially mediates the effect of limited time scarcity on impulse buying. Previous research has investigated e-commerce, even though both take different places. Odgen et al. (2019) stated that limited time can stimuli someone emotions to creates a reaction on something. Guo et al. (2017) also stated that the impact of scarcity messages on impulsive buying is maximized when they create a sense of urgency (limited time), thus stimulating arousal.

These findings partially align with the theory proposed by Solomon (2020), who stated that impulse buying can be defined as purchasing something that is out of plan and is usually driven by emotion, wants, or essential needs without any good decision-making. This study shows that arousal can push consumers to impulse buy, supported by limited time scarcity. This study shows that limited items do not encourage consumers to buy things immediately. As discussed in the previous results from the first to the fifth hypothesis results, we can conclude that e-commerce must create more interesting (not only provide a limited time) but e-commerce can pick a viral product that is desired by many people so that the flash sales event can arouse consumer emotion to create impulse buying. We can conclude that limited quantity scarcity does not directly affect impulse buying, and arousal does not mediate the effect of limited quantity scarcity on impulse buying. However, arousal partially mediates the effect of limited time scarcity on impulse buying because limited time scarcity does not directly affect impulse buying. Quantity does not affect well because of changes in consumer behavior. Changes in customer behavior include being more brand-conscious and preferring to choose a brand as their value. Therefore, many customized products fit the values and needs of each customer. Regarding the limited time scarcity, e-commerce has successfully used that strategy to push their sales, and e-commerce has to be more focused on the limited time strategy to move more customers to make impulse purchases and create more sales.

5. Conclusion

Seven hypotheses were tested in this study. It was found that while limited time scarcity significantly impacts arousal, limited quantity scarcity does not. Interestingly, only arousal had a significant direct impact on impulse buying, not the scarcity factors. Additionally, the study revealed that arousal partially mediates the effect of limited time scarcity on impulse buying, but does not mediate the effect of limited quantity scarcity on impulse buying. This research limitation is that, first, the gender of our respondents is unequal. The majority of respondents were women. In future research, the researcher can search for respondents to be more equal between men and women. The following limitation is that the respondents' domicile is mainly in Semarang. Therefore, future research should explore other Indonesian cities.

The theoretical implications for future researchers are that they can investigate other variables affecting impulse buying. Time pressure, quantity pressure, economic benefits, social influence, and visual and auditory stimuli can effectively stimulate emotional responses, leading to online buying behavior (Ngo et al., 2024). Therefore, some variables can be used in future research to complete this research topic. In addition, according to this result, the R-squared is classified as a low score; therefore, the researcher might need to add some variables for this research topic. This research has a positive result, especially in the mediation effect, even though only limited time scarcity affects impulse buying through arousal. The managerial implication of this result is that e-commerce must focus on the limited time for their promotion events to arouse customers so that they can impulsively buy.

These findings suggest that e-commerce can create more effective flash sales by maximizing perceived scarcity and arousal, leading to increased engagement and sales. E-commerce must also focus on women in the digital native age as their target market. Due to emotional influence and greater spending power, they are easily engaged in impulse buying, particularly during flash sales.

Acknowledgement

We gratefully thanked God, Jesus Christ, for blessing us. He has given us grace and was generous for me to complete this research entitled "Scarcity Effect on Online Impulse Buying; The Mediating Role of Arousal ."Thankfully, we can finish this research well after facing many difficulties. This research is done for the final assignments to complete the Strata I (S1) degree at Soegijapranata Catholic University. We realize this research would not have been possible without the help and support of the parties involved. Therefore we want to give our thanks for: 1) Mrs MG Westri Kekalih Susilowati is our advisor, who always gives suggestions and guidance on completing this research, 2) Mr and Mrs Gregorius Suwito are our parents, and they give courage and prayers for this research, and 3) All my friends are our support system in completing this research.

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