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The Influence of Scarcity Promotion on Impulse Purchase Behavior: A Mediation Analysis of Arousal

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ABSTRACT

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Flash sales present an opportunity for online marketplaces to stimulate impulse purchases. This study aims to examine and analyze the effect of scarcity promotion on impulse purchases, with arousal serving as a mediating variable. This research employs a quantitative approach. The sample consists of individuals who participated in a live streaming flash sale by Toko Emas Semar Nusantara on TikTok Shop on November 11, 2024. Data were collected using a Google Form distributed via messages to respondents who had made purchases during the live streaming flash sale. The data analysis was conducted using Jeffreys's Amazing Statistics Program (JASP). The findings indicate that scarcity promotion has a positive and significant effect on arousal; arousal, in turn, has a positive and significant effect on impulse purchases. Additionally, scarcity promotion has a positive and significant influence on impulse purchases. Furthermore, arousal serves as a partial mediator between scarcity promotion and the tendency to make impulse purchases. The managerial implication of this study suggests that business owners should focus on scarcity-driven flash sales to stimulate consumer arousal, thereby enhancing impulse purchases. This study aims to provide business owners with insights into effective product marketing strategies on TikTok Shop, supporting increased sales.

INTRODUCTION

The rapid development of information technology has transformed people's lifestyles, significantly impacting shopping behavior in Indonesia. Currently, a notable phenomenon is the increasing preference for online shopping over traditional offline shopping among Indonesian consumers. This shift has contributed to the rise of e-commerce in the country. According to data from katadata.co.id (2024), e-commerce was the largest contributor to Indonesia's digital economy in 2023. Furthermore,

Statista (2024) reported that, as of April 2023, the online market emerged as the online shopping platform with the highest number of transactions worldwide. Kannan and Li (2016) indicated that promotions, particularly during the initial production and launch phases of a product, can significantly enhance sales figures in e-commerce. One of the most effective promotional strategies is the implementation of daily deals in the form of flash sale events.

Flash sales are promotional activities that offer products at lower prices than usual for a limited time and in limited quantities. These sales are utilized to promote products and increase sales due to their ability to capture buyers' attention (Zhang, Cheng, and Du, 2018). An example of a company that employs a flash sale strategy is Toko Emas Semar Nusantara. Figure 1.1 illustrates the flash sales at Toko Emas Semar Nusantara.

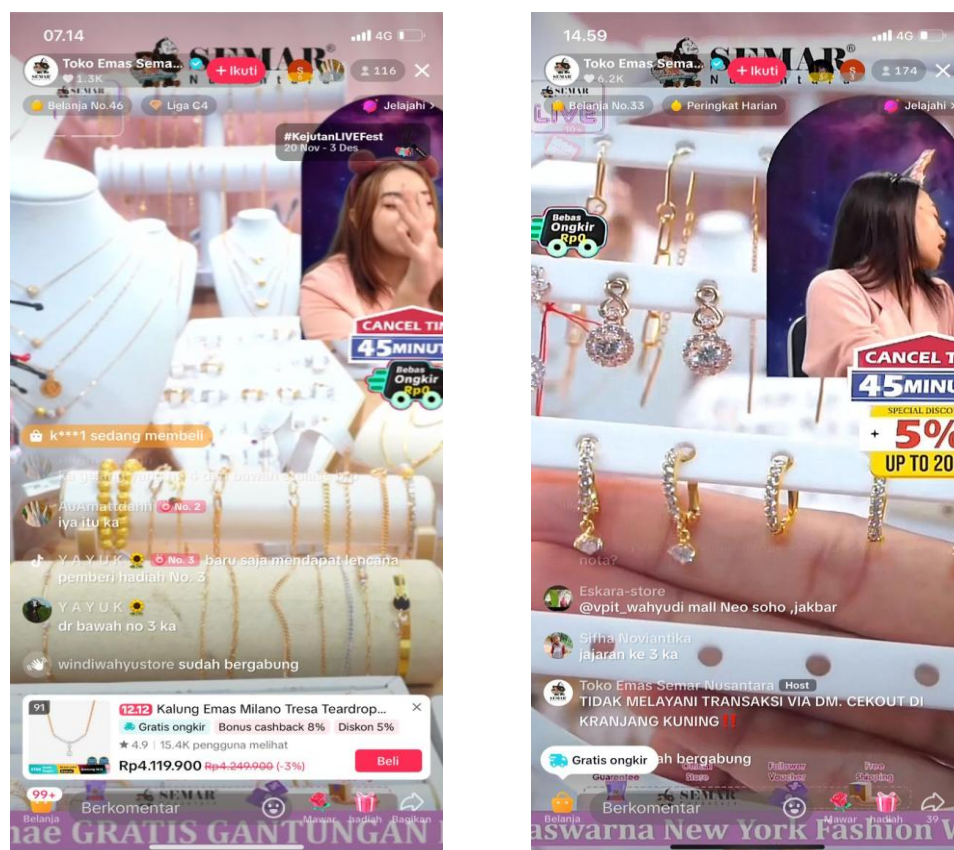


Figure 1. Flash sale display at Toko Emas Semar Nusantara

According to Wu, Xin, Li, Yu, and Guo (2020), flash sales can be utilized to evaluate promotional strategies because they provide information about scarcity. Furthermore, Guo, Xin, and Wu (2017) explain that promotional strategies based on scarcity can effectively attract impulse purchases. In this context, the limitations of

quantity and time create an online shopping environment that influences consumer decision-making regarding impulse purchases. This assertion is supported by Islam, Pitafi, Arya, Wang, Akhtar, Mubarik, and Xiaobei (2021), who state that scarcity promotions can heighten the urgency felt by consumers, thereby facilitating impulse purchases.

Impulse purchases, as defined by Guo et al. (2017), are purchasing decisions triggered by easy access to products, the convenience of purchase, and free shipping. The phenomenon of impulse purchase can be understood through the mental state induced by the online shopping environment. This aligns with Wu et al. (2020), who assert that the impulse purchase process is characterized by a lack of cognitive deliberation and is predominantly driven by emotions. In this scenario, consumers often experience positive affective reactions, such as arousal, which diminishes information processing and cognitive evaluations.

Arousal is an emotional state of excitement elicited by online cues. Increased arousal can limit consumer attention to specific cues, leading consumers to overlook more comprehensive product information and engage in less careful decision-making (Wu et al., 2020). Several prior studies have indicated that arousal can mediate the relationship between scarcity promotion and impulse purchases (Guo et al., 2017; Wu et al., 2021; Li et al., 2023).

This research employs the Stimulus-Organism-Response (SOR) theory to explain how stimuli perceived by individuals trigger internal responses that ultimately influence behavior. This theory has been widely applied in impulse purchase research due to its capacity to represent individual internal responses to factors influencing impulse purchase (Chan et al., 2017). The results of this study are expected to contribute both theoretically and practically. Theoretically, this study aims to examine the mechanisms by which scarcity promotion influences consumer impulse purchase responses through arousal mediation and to investigate the impact of scarcity promotion and arousal on impulse purchases. Practically, this study seeks to provide guidelines for the effective implementation of promotional strategies involving limited quantities and time constraints. Additionally, this study offers recommendations for consumers to be mindful of their emotional responses to marketers' scarcity promotion strategies (Chen and Zhang, 2023)

LITERATURE REVIEW

Stimulus Organism Response Theory (SOR)

The Stimulus-Organism-Response (SOR) theory encompasses individual variables (human factors), situational variables (environmental factors), and the interactions between individuals and their environment. Initially, the SOR model was introduced by Mehrabian and Russell (1974), focusing on various dimensions that can stimulate consumers and highlighting the emotional and behavioral responses elicited by these stimuli. This implies that the SOR framework is based on the assumption that changes in behavior are influenced by the quality of communication stimuli received by the organism. Furthermore, Chan et al. (2017) noted that the SOR model has been widely employed in assessing impulsive purchase behavior.

Hypothesis Development

Scarcity promotion is strategically designed as a restriction on time, demand, discounts, and conditions of product purchase within consumer behavior research. This approach is particularly effective for marketing limited edition products (Islam et al., 2021). Furthermore, Wu et al. (2020) assert that scarcity promotion, manifested through limited quantities and time constraints, is perceived as a scarcity message. Guo et al. (2017) indicate that scarcity promotion, characterized by limited quantities coupled with time pressure and competition, leads consumers to feel that they are competing with others for the products offered by marketers. This situation stimulates consumers and generates competitive arousal, motivating them to acquire the product.

H1 : Scarcity Promotion has a significant positive effect on arousal

Affective reactions to the environment significantly influence individual responses, such as the urge to make impulsive purchases (Guo et al., 2017). This finding aligns with the work of Chang et al. (2014) and Wu et al. (2020), who assert that arousal positively impacts the impulsive urge to buy. Furthermore, Chen et al. (2020) suggest that individuals may engage in impulse purchases due to uncontrollable stimuli or arousal triggered by visual cues. This assertion is supported by research conducted by Cengiz and Senel (2023), Islam et al. (2021), and Liu et al.

(2019), which indicates that arousal has a significant positive effect on impulse purchases.

H2 : Arousal has a significant positive effect on impulse purchases.

Scarcity promotion can enhance consumer demand, prompting consumers to make decisions more quickly. This phenomenon occurs due to time constraints and limitations on product availability. Consequently, the perceived competition among certain consumers and an unknown group of competitors increases dramatically with heightened scarcity (Wu et al., 2021).

H3 : Scarcity Promotion has a significant positive effect on impulse purchases

Scarcity promotion, characterized by limited quantities and time constraints, can lead to impulse purchases. It is anticipated that scarcity promotion will maximize impulsive behavior when arousal is stimulated through messages emphasizing limited availability and time (Guo et al., 2017). Furthermore, Wu et al. (2021) suggest that scarcity promotion is likely to enhance impulse purchases when arousal is present, as arousal can lead consumers to unconsciously accelerate their decision-making processes.

H4 : Scarcity Promotion has a significant positive effect on impulse purchases through arousal

METHODS

Design Study

This research is classified as causal research, aimed at determining the influence between research variables and testing previously formulated hypotheses. The research method employed is the survey method, and the approach utilized is quantitative.

Population, Sample, and Sampling Techniques

The population of this study consisted of individuals who participated in the live streaming flash sale of Toko Emas Semar Nusantara on TikTok Shop. The sample

included individuals who made a purchase during this live streaming event on November 11, 2024. The minimum sample size for this study was set at 100 consumers, as calculated according to Ariestonandri (2006:94).

$$n \geq 1/\alpha^2 = 1 / 0.1^2 = \geq 100$$

The sampling technique employed in this study utilized a non-probability design. The determination of respondents included in the sample was conducted using the purposive sampling method, specifically targeting the following criteria:

1. Individuals who made purchases during the live streaming flash sale of Toko Emas Semar Nusantara on TikTok Shop on November 11, 2024.
2. Individuals aged between 26 and 55 years, as data from <https://dailysocial.id/post/survei-investasi-populix> indicates that gold investment is particularly popular among Generation X and the millennial generation.

Data collection was carried out using a Google Form, which was distributed via message to respondents who had made a purchase during the live streaming event of Toko Emas Semar Nusantara on TikTok Shop on November 11, 2024. The data analysis tool utilized in this study was Jeffreys's Amazing Statistics Program (JASP).

Operational Definition of Variables and Measurement of Variables

The following are operational definitions of the variables and variable measurements used in this study:

1. Scarcity promotion

Scarcity promotion is operationally defined as a promotional strategy employed by marketers that involves limiting sales to a specific number of units and a designated time frame. According to Islam et al. (2021), scarcity promotion is measured using eight statement items, as follows:

Table 1. Scarcity Indicators and Statement Items Promotion

Variables	Indicator	Statement Items
Scarcity promotion	Scarcity promotion in the form of limited quantities	I feel that the products and stock quantities of each product available in the flash sale are limited.

	I feel like the products I'm interested in in flash sales usually sell out quickly.
	I am concerned about the limited number of products on flash sales.
	I feel like the products I want in flash sales are often rarely available.
Scarcity limited time promotion	I feel like the time available to shop during a flash sale is limited.
	I noticed that the duration of the flash sale doesn't last long.
	When I shop at a flash sale , I worry about the remaining shopping time.
	I feel like the flash sale duration is ending quickly

Source: Islam, et al . (2021)

2. Arousal

Arousal is the level at which a person feels highly stimulated, excited, aroused, enthusiastic, and happy in a situation. According to Islam, et al . (2021) arousal can be measured using 4 statement items as follows:

Table 2. Arousal Statement Indicators and Items

Variables	Indicator	Statement Items
Arousal	Competitive arousal	Flash sales make me stimulated to buy a product
		Flash sales make me stimulated to buy a product
	Exited Arousal	Flash sales make me very excited to buy a product
		Flash sales make me feel enthusiastic to buy a product.

Source: Islam, et al . (2021)

3. Impulse purchase

Impulse purchase is the result of exposure to stimulus, and is decided at that time. According to Islam, et al . (2021) impulse purchase can be measured using 4 statement items as follows:

Table 3. Impulse Purchase Indicators and Statement Items

Variables	Indicator	Statement Items
Impulse purchase	Cognitive	I usually buy products in flash sales
	Deliberation	spontaneously.
	Unplanned purchase	the products I buy in flash sales are unplanned.
	Disregard for the Future	I bought a product in a flash sale but initially I didn't want to buy it.
		I can't resist purchase a product on flash sale if I really like it.

Source: Islam, et al . (2021).

RESULTS**Validity Test**

Validity testing is conducted on the questionnaire instrument to assess the accuracy and precision of the measuring tool (questionnaire) in fulfilling its function and accurately disclosing data. An indicator is considered valid if the calculated r value (r count) is greater than the critical r value (r table) and is positive. The calculation of the critical r value uses degrees of freedom (df) calculated as $n - 2$; thus, for this study, $df = 130 - 2 = 128$, resulting in a critical r value of 0.1646. A summary of the validity test results is presented in Table 4.

Table 4. Summary of Validity Test Results

Questionnaire Items	r count	r table	Conclusion	Information
X1.1	0.337	0.1646	r count $>$ r table	valid
X1.2	0.270	0.1646	r count $>$ r table	valid
X1.3	0.411	0.1646	r count $>$ r table	valid
X1.4	0.328	0.1646	r count $>$ r table	valid
X1.5	0.414	0.1646	r count $>$ r table	valid
X1.6	0.337	0.1646	r count $>$ r table	valid
X1.7	0.373	0.1646	r count $>$ r table	valid

Questionnaire Items	r_{count}	r_{table}	Conclusion	Information
X1.8	0.458	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
X2.1	0.717	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
X2.2	0.645	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
X2.3	0.734	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
X2.4	0.727	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
Y1.1	0.771	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
Y1.2	0.765	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
Y1.3	0.756	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid
Y1.4	0.737	0.1646	$r_{\text{count}} > r_{\text{table}}$	valid

Source: Primary Data Processing, 2024

The results of the validity test for all questionnaire instruments are valid, because the calculated r value is greater than the r_{table} which is 0.1646, so all statements used meet the validity requirements. This means that all statement items contained in each variable are declared valid and can be used as statement items in this study.

Reliability Test

Reliability testing of questionnaire instruments is carried out to determine whether the results of a measurement can be trusted.

Table 5. Summary of Reliability Test Results

Questionnaire	Alpha count	Cronbach's Alpha	Status
Scarcity promotion	0.940	0.7	Reliable
Arousal	0.810	0.7	Reliable
Impulse purchase	0.868	0.7	Reliable

Source: Primary data processing, 2024

Reliability testing uses the Cronbach's Alpha (α) technique. According to Ghozali (2006:41), a construct is said to be reliable if the Cronbach's Alpha value is > 0.7 . The results of the questionnaire instrument reliability test are in Table 5 which shows that the alpha value of the research instrument on each variable is greater than 0.70 so that the questionnaire instrument is reliable.

Data Normality Test

Normality test is an important step in statistical analysis to determine whether the data follows a normal distribution. One of the common visual methods used to test

normality is the QQ plot (Quantile-Quantile plot). According to Montgomery and Runger (2014) the steps to Read QQ Plot are:

1. QQ Plot Axis:

The horizontal axis (x-axis) represents the theoretical quantiles of the normal distribution. The vertical axis (y-axis) represents the quantiles of the tested sample data.

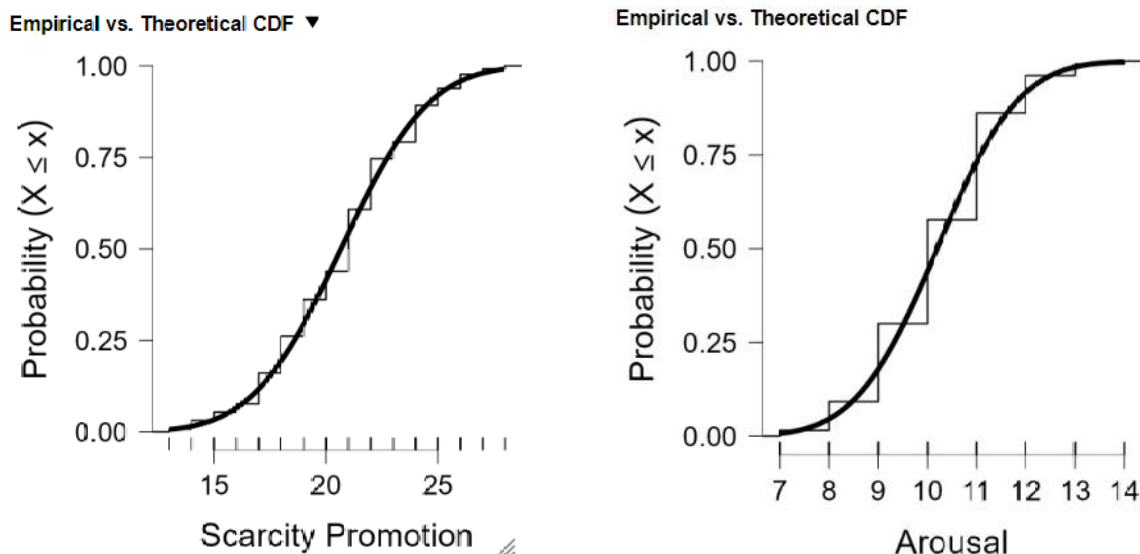
2. Reference Line:

The reference line shows a perfect normal distribution. Data that follows a normal distribution will fall around the line.

3. Interpretation:

If the data points follow the reference line well, the data can be considered normally distributed. If the data points deviate far from the reference line, especially at the ends of the plot, then it indicates that the data is not normally distributed.

The following are the results of the normality test in this study:



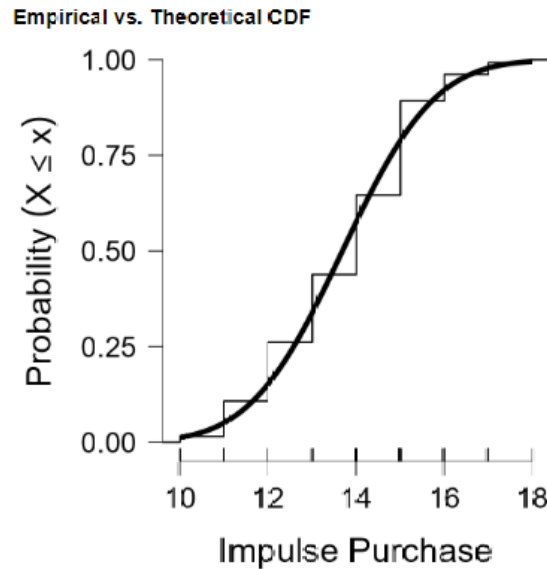


Figure 2. Normality Test

Source: Primary data processing, 2024

Figure 2 normality test shows that based on the observation of the QQ plot, the diagonal line represents the ideal normal distribution, the points are spread around the reference line, this indicates that the data is normally distributed.

Multicollinearity Test

The multicollinearity test used in this study is by looking at the VIF (Variance Inflation Factor) value and tolerance value.

Table 6. Multicollinearity Test

Variables	Collinearity Statistics		Information
	Tolerance	VIF	
Arousal	0.332	3,012	There is no multicollinearity
Scarcity Promotion	0.332	3,012	There is no multicollinearity

Source: Primary data processing, 2024

In table 6, the VIF value of the arousal and scarcity promotion variables is 3.012 ($3.012 < 10$), while the tolerance value of the arousal and scarcity promotion variables is 0.332 ($0.332 > 0.10$). So it can be concluded that there is no multicollinearity problem found in the regression model.

Heteroscedasticity Test

The results of the heteroscedasticity test in this study were processed using a scatterplot. Figure 3 illustrates the heteroscedasticity test results for this research.

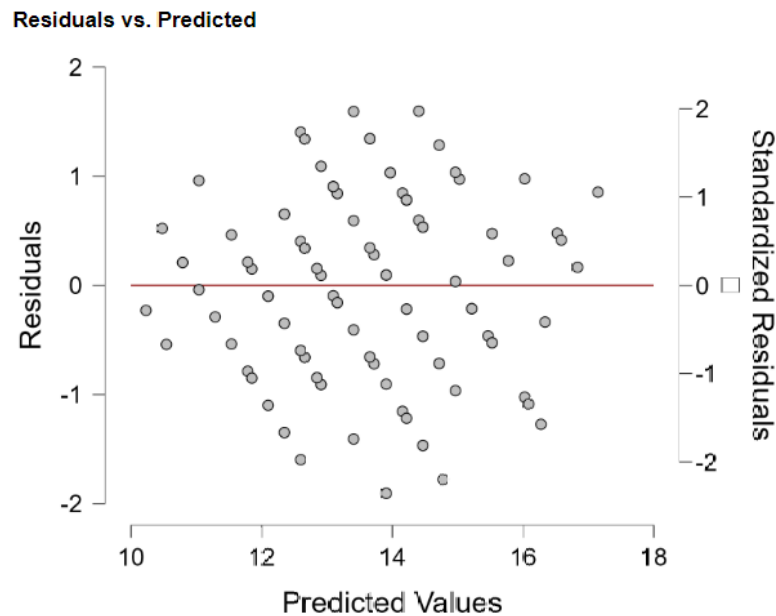


Figure 3. Heteroscedasticity Test

Source: Primary data processing, 2024

The heteroscedasticity test in Figure 3 (scatterplot) shows that the points are spread randomly both above and below the number 0 on the Y axis, so it can be concluded that there is no heteroscedasticity in this study.

Analysis Results

The results of the path analysis using the JASP data analysis tool were obtained as follows:

Table 7. Direct Influence

Variable Relationship	Est.Koef Path	CR (t value)	p- value	Conclusion
Scarcity Promotion → Arousal	1,933	16,046	0.001	sig
Arousal → Impulse Purchase	1,043	16,706	0.001	sig
Scarcity Promotion → Impulse Purchase	0.151	6,252	0.001	sig

Source: Primary data processing, 2024

Table 7 results of direct influence, shows that the influence of scarcity promotion on arousal has a coefficient of 1.933 with a t value of 16.046 and a significance of 0.001, because the significance value is smaller than 0.05 ($0.001 < 0.05$) then H1 is accepted so that scarcity promotion has a positive significant influence. on arousal. Furthermore, the influence of arousal on impulse purchase has a coefficient of 1.0433 with a t value of 16.706 and a significance of 0.001, because the significance value is less than 0.05 ($0.001 < 0.05$) then H2 is accepted so that arousal has a positive significant influence on impulse purchase . Then the effect of scarcity promotion on impulse purchase has a coefficient of 0.151 with a t value of 6.252 and a significance of 0.001 because the significance value is less than 0.05 ($0.001 < 0.05$) then H3 is accepted so that scarcity promotion has a positive significant effect against impulse purchases .

Mediation Test

Table 8. Indirect Influence

Variable Relationship			Est.Koef Path	CR (t value)	p-value	Conclusion
Scarcity	Promotion	→Arousal →Impulse Purchase	0.118	5,588	0.001	sig

Source: Primary data processing, 2024

Table 8 results of indirect influence, shows that the influence of t scarcity promotion on impulse purchase through arousal has a coefficient of 0.118 with a t value of 5.588 and a significance of 0.001, because the significance value is smaller than 0.05 ($0.001 < 0.05$) then H4 is accepted so that scarcity promotion has a positive significant influence. towards impulse purchases through arousal.

Table 9. Total Influence

Variable Relationship			Est.Koef Path	CR (t Value)	p-value
Scarcity	Promotion	→Impulse Purchase	0.269	17,103	0.001

Source: Primary data processing, 2024

Table 9 total influence results show that the influence of scarcity promotion on impulse purchase has a coefficient of 0.269 with a t value of 17.103 and a significance

of 0.001. More clearly, to describe the magnitude of the path, a path diagram is made as shown in Figure 4 below.

Path plot

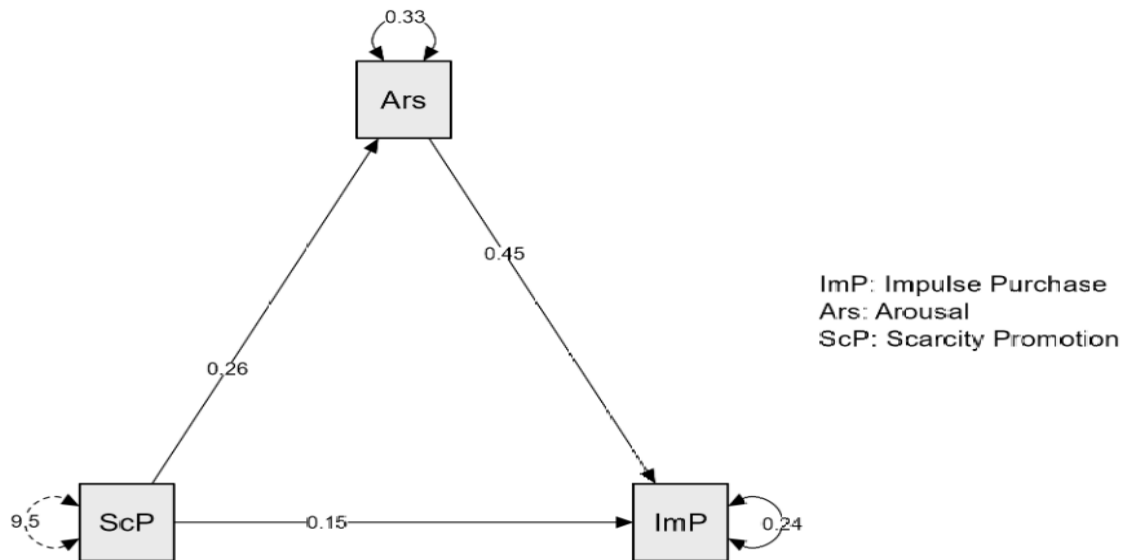


Figure 4. Path Diagram

Source: Primary data processing, 2024

Discussion

The Influence of Scarcity Promotion of Arousal

The significant positive relationship between scarcity promotion and arousal ($\beta = 1.933$, $t = 16.046$, $p < 0.001$) supports H1 and aligns with extant literature. Aggarwal et al. (2011) posit that limited-quantity promotions create a sense of exclusivity and competition, stimulating consumer excitement. This heightened arousal is further corroborated by Sutrisno et al. (2022), who found that scarcity directly influences arousal, generating a sense of enthusiasm. Islam et al. (2021) highlight the strategic application of scarcity in marketing limited-edition products, emphasizing the role of time constraints, demand limitations, and unique purchase conditions. The findings of this study are consistent with prior research by Wu et al. (2020) and Guo et al. (2017), reinforcing the established link between scarcity promotions and heightened consumer arousal.

The Influence of Arousal on Impulse Purchase

The significant positive effect of arousal on impulse purchases ($\beta = 1.043$, $t = 16.706$, $p < 0.001$) supports H2 and aligns with existing research. The heightened

arousal experienced during flash sales, characterized by excitement and enthusiasm stemming from discounted prices and time-limited offers, can lead to impulsive buying decisions. Consumers, driven by a desire to capitalize on the opportunity and avoid missing out, often forgo careful consideration before making a purchase. This aligns with findings from Chang et al. (2014) and Wu et al. (2020), who demonstrated a positive relationship between arousal and impulsive buying tendencies. Furthermore, Chen et al. (2020) highlight the role of uncontrollable stimuli and intense buying urges in impulsive purchases. This is further supported by the research of Cengiz and Senel (2023), Islam et al. (2021), and Liu et al. (2019), all of which confirm the significant positive influence of arousal on impulse buying behavior.

The Influence of Scarcity Promotion on Impulse Purchase

The significant positive relationship between scarcity promotion and impulse purchases ($\beta = 0.151$, $t = 6.252$, $p < 0.001$) supports H3. This finding suggests that scarcity promotions can induce impulsive buying behavior, even among consumers who were not initially interested in the product. The perceived higher value associated with limited-quantity offers can overcome initial purchasing hesitation. The competitive pressure created by scarcity, as highlighted by Wu et al. (2021), further intensifies the urge to purchase, leading to impulsive decisions. This effect is amplified by the cognitive aspects of scarcity, such as reduced deliberation and disregard for future consequences, which are known to contribute to impulsive buying.

The Influence of Scarcity Promotion on Impulse Purchase Through Arousal

The significant indirect effect of scarcity promotion on impulse purchases through arousal ($\beta = 0.118$, $t = 5.588$, $p < 0.001$) supports H4 and demonstrates the mediating role of arousal. Scarcity, by inducing heightened arousal – including feelings of desire, anxiety, fear of missing out (FOMO), and excitement – increases the likelihood of impulsive buying. The partial mediation observed suggests that while scarcity has a direct effect on impulse purchases, a substantial portion of this effect is channeled through the mediating mechanism of arousal. The significant positive relationship between scarcity promotion and impulse purchases remains even when considering the indirect effect via arousal, indicating that both direct and indirect pathways contribute to the overall effect.

CONCLUSIONS

This study provides empirical support for the hypothesized relationships among scarcity promotion, arousal, and impulse purchases within the context of livestreaming flash sales. The findings confirm that:

1. Scarcity promotion significantly and positively influences arousal. The limited availability of products and the time constraints inherent in flash sales create a stimulating environment that heightens consumer arousal.
2. Arousal significantly and positively influences impulse purchases. Elevated arousal, characterized by heightened emotional states, reduces consumers' ability to resist impulsive buying tendencies.
3. Scarcity promotion significantly and positively influences impulse purchases. The scarcity itself acts as a direct driver of impulsive buying behavior, even independent of the mediating role of arousal.
4. Arousal plays a significant mediating role in the relationship between scarcity promotion and impulse purchases. The results indicate partial mediation, suggesting that while scarcity has a direct impact on impulse buying, a considerable portion of this effect is mediated through the arousal response generated by the scarcity promotion. This highlights the importance of considering both direct and indirect pathways when analyzing the impact of scarcity promotions on consumer behavior. These findings contribute to a more nuanced understanding of the mechanisms underlying impulsive purchasing in the context of livestream commerce.

BIBLIOGRAPHY

- Aggarwal, P., Jun, S., & Huh, J. (2011). Scarcity messages: A consumer competition perspective. In *Journal of Advertising* (Vol. 40, Issue 3, pp. 19–30). <https://doi.org/10.2753/JOA00913367400302>
- Cengiz, H & Senel, M. 2023. The effect of perceived scarcity on impulse-buying tendencies in a fast fashion context: A mediating and multigroup analysis. Emerald Insight. <https://www.emerald.com/insight/1361-2026.htm>

- Chan, TKH, Cheung, CMK, & Lee, ZWY (2017). The state of online impulse-buying research: A literature analysis. *Information and Management*, 54(2), 204–217. <https://doi.org/10.1016/j.im.2016.06.001>
- Chang, H.-J., Yan, R.-N., Eckman, M.: Moderating effects of situational characteristics on impulse buying. *Int. J. Retail Distrib. Manage.* 42(4), 298–314 (2014)
- Chen, C and Zhang, D. (2023). Understanding consumers' live-streaming shopping from a benefit–risk perspective. *Emerald Insight*. <https://doi.org/10.1108/JSM-04-2022-0143>.
- Chen, W. K., Chen, C. W., & Lin, Y. C. (2020). Understanding the influence of impulse buying toward consumers' post -purchase dissonance and return intention: an empirical investigation of apparel websites. *Journal of Ambient Intelligence and Humanized Computing*. <https://doi.org/10.1007/s12652-020-02333-z>
- Guo, J., Xin, L., & Wu, Y. (2017). Arousal or not? The effects of scarcity messages on online impulsive purchases. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 10294 LNCS, 29–40. https://doi.org/10.1007/978-3-319-58484-3_3
- <https://databoks.katadata.co.id/datapublish/2023/11/06/e-commerce-sektor-penumbang-economic-digital-terbesar-indonesia-pada-2023>
- Islam, T., Pitafi, A.H., Arya, V., Wang, Y., Akhtar, N., Mubarik, S., Xiaobei, L. (2021). Panic buying in the COVID-19 pandemic: A multi-country examination. *Journal of Retailing and Consumer Services*
- [JA Russell, A. Mehrabian, Evidence for a three-factor theory of emotions, J. Res. Press. 11\(3\) \(1977\) 273–294.](#)
- Kannan, P. K., & Hongshuang, L. (2016). Digital Marketing: A Framework, Review and Research Agenda. Elsevier, vol. 34(1), pages 22-45. *International Journal*.
- Liu, Y., Li, Q., Edu, T., Jozsa, L., & Negricea, I.C. (2019). Mobile shopping platform characteristics as consumer behavior determinants. *Asia Pacific Journal of Marketing and Logistics*, 32(7), 1565–1587. <https://doi.org/10.1108/APJML-05-2019-0308>.
- Montgomery, D. C., & Runger, G. C. (2014). *Applied Statistics and Probability for Engineers*. John Wiley & Sons.

- Statista. (2024). <https://www.statista.com/statistics/861336/share-online-shopping-customers-vs-sales-by-platform/>
- Sutrisno, TG, Santoso, SL, & Tandjung, NC (2022). How Scarcity Promotion Affects Online Impulse Purchasing (Scarcity Promotions Effect on Online Impulse Purchasing). <https://doi.org/10.35814/mind%20set.v13i01.2732>
- Wu, Y., Xin, L., Li, D., Yu, J., & Guo, J. (2020). How does scarcity promotion lead to impulse purchases in the online market? A field experiment. *Information and Management*, 58 103283 (1) . <https://doi.org/10.1016/j.im.2020.103283>
- Zhang, M., Cheng, T. C.E., & Du, J. (2018b). Advance selling of new products to strategic consumers on flash sale platforms. *International Journal of Logistics Research and Applications*, 21(3), 318–331. <https://doi.org/10.1080/13675567.2018.1454416>