The Role of Algorithmic Ad Personalization in Driving Impulse Buying Behavior: Mediating Effects of Perceived Value and Moderating Personality Traits

Muhammad Shafqat Rasool
(Corresponding Author)
PhD Business Administration Scholar, Superior University Lahore
Email: Shafqat.rasool6280@gmail.com

Ali Sajjad
Assistant Professor, Faculty of Business & Management Sciences, Superior University Lahore
Email: alisajjadc@gmail.com

Syeda Aneeqa Touseef
PhD Business Administration Scholar, Superior University Lahore
Email: syedaaneeqatouseef@gmail.com

Abstract
This research investigates how personalized advertisements in algorithms can cause people to shop on impulse, and it reveals that this effect is influenced by perceptions of value (emotion, social & price) and influenced by trait personality (extraversion and agreeableness). A sample of 106 responses were collected using Likert scales that had been changed to fit the purpose of the study. The collected data were analyzed using PLS-SEM, and the results showed that customized ads can lead people to make impulsive purchases. It was found that the value individuals anticipate before making a purchase, along with its social, emotional, and price elements, affects the link between algorithmic ad personalization and impulsive buying. In addition, having an extroverted and agreeable personality helps make this type of mediation stronger. The research integrates the S-O-R framework and considers the impact of different factors to explain how someone's traits influence their buying decisions when seeing personalized ads on the internet. As a result, marketers are able to target ads and campaigns toward specific traits to boost the effectiveness of what they do online. For greater generalizability, researchers need to consider traits like neuroticism or conscientiousness in their future studies, use designs that last a long time, and test specific hypotheses.

Keywords: Algorithmic Ad Personalization, Impulsive Buying Behavior, Perceived Value, Personality Traits, Extraversion, Agreeableness, Emotional and Social Value, Consumer Behavior, Digital Marketing.

1. Introduction

Over the past few years, unprecedented development of digital marketing technologies has emerged as a key driver of new buying behaviours (Zarouali et al., 2021). Algorithmic ad personalization has become a powerful weapon that utilizes consumer statistics to market products across platforms such as Facebook and Instagram (Ali et al., 2024). Personalized advertisements make content relevant and engaging through complex algorithms, making user shopping experiences more enjoyable and forcing them to make particular purchases (Zarouali et al., 2021). Using such specific promotional techniques brings essential psychological and behavioural issues that affect consumers. According to Chu (2023), personality advertisements influence consumer decision-making processes by appealing to emotional and cognitive responses, which supports the S-O-R model. In particular, spontaneous buying behaviour, or consumers' tendency to impulse purchase, has received much interest.

Knowledge of the dynamics and antecedents of this behaviour, especially regarding algorithmic advertising, is relevant for marketing practitioners and academics.

While there is interest in algorithmic ad personalization, there is a limited understanding of the mechanisms and synergy that lead to impulsive buying behaviour (Chu, 2023). This research intends to fill these gaps by examining the interaction between algorithmic ad personalization (independent variable), perceived value before purchase (mediator), and impulsive purchasing behaviour (dependent variable), with extraversion and agreeableness personality traits as the moderating variables. In prior studies, researchers have examined person and object elements separately. Therefore, the holistic understanding of these connections has not been investigated much. For example, Zarouali et al. (2021) call for attention to algorithmic awareness, and Walsh et al. (2014) propose that perceived value be incorporated into the decision-making process. This study connects these perspectives by studying if personalized ads impact impulsive buying, using the S-O-R framework where the stimulus, algorithmic ads, affects the organism's perceived value (impulse buying).

Messages in the form of advertisements are one of the stimuli for this model, and personalization of ads using algorithmic recommendation programs is particularly effective (Nablsi, 2024). These advertisements also focus on consumers' attention, emotions, and cognitive appraisal in consumers, resulting in impulse buying tendency consequences. According to Wu, Chiu, and Chen (2020), such purchases result from impulse, motivated by emotions, low perceived risks, and frictionless purchase processes. This research extends from their study by adopting pre-purchase perceived value as a mediator between the stimulus (algorithmic ads) and the response (impulsive buying behavior). Perceived value, as the intermediary variable, also suggests that it serves to establish the relationship between the stimulus and the reaction while emphasising that actions and choices are frequently not made on the spur of the moment but rather in accordance with cognitive and affective evaluations (Ampadu et al., 2023).

Extraversion and agreeableness are the personality traits considered moderators of the model (Nablsi., 2024). For instance, while extroverted persons, who are outgoing and have less self-control, may be easily swayed by appealing feelings in the advertisements, agreeable individuals who act concerning other people and can be trusted to reciprocate may react differently to appeals to social value in advertising from personalized ads. Ali et al. (2021) have proved that personality plays a vital role in compulsive and impulsive buying consumer behaviour. Xiong and Tseng (2024) suggested that the consumer behaviours are mediated through influencer characteristics and perceived uniqueness at the crossover of algorithmic personalization and influencer endorsement. This paper builds from their work to establish how these traits can help expand knowledge on the relationship between perceived value and the much-researched impulsive buying behaviour.

The researcher worked to resolve existing gaps by integrating different perspectives into a model. It includes mediating and moderating factors in the S-O-R framework to highlight the causes of impulsive buying. This also points out how customized ads guided by algorithms play a big part in influencing people and gives businesses new insights to help them create better approaches. Furthermore, this study examines the emotional, mental, social, and sensory sides of value and how different personality traits lead to differences between people. The findings of the research benefit both professionals and academics, suggesting new strategies for tech vendors, communicators, and advertisers on how automated advertising, perceived value, personality traits, and impulsive buying work together.

2. Literature Review

2.1 The Influence of Algorithmic Ad Personalization on Consumer Behavior
Personalized advertisements based on algorithms have gained significant industry attention because of their significant impact on purchase behavior (Kerley., 2024). Targeted advertising hinges on

complex algorithmic circuits in order to produce ad content from basic client information such as browsing history, particular likes and dislikes, and social media trail. According to Ram, Maryam, and Bernard (2024), the application of AI in advertising as a persona connects with the consumer focus and produces relevant ads that create positive ad experiences while impacting the consumer's buying behavior. A study shows that advertising intervention plays a crucial role in affecting consumer-purchase decisions and, thereby, changing consumers' spontaneous buying behaviors (Xiong and Tseng, 2024). Personalized ads happen to be highly effective when marketing campaigns present viewers with content that they are interested in, this boosts the conversion percentage hence making personalized advertisements a very important marketing tool.

2.2 Understanding the S-O-R Model in the Context of Algorithmic Advertising

The Stimulus-Organism-Response (S-O-R) model provides an extensive model of how algorithmic ads change the consumer's behavior. This research shows that through the S-O-R model, external variables such as personalized advertisements prompt consumers' internal psychological states of cognition and affect that cause a direct conditional response through impulsive buying behavior. Chu (2023) uses the S-O-R model to show that customized advertisements rely on reactions from consumers and basic and secondary appraisals to make cognitive and emotional decisions. Web ads are thus transformed into stimuli to which, based on customer data collected, algorithms are triggered to elicit their emotional and perceptual responses before being directed towards impulsive buying behavior (Ampadu et al., 2023). The S-O-R model presents a conceptual lens through which to enunciate the role of algorithmic advertisements in reconfiguring consumer participation.

2.3 Pre-purchase Perceived Value as a Mediator

Pre-purchase perceived value has the significant role of an intermediary between personal advertisement and impulsive buying behavior. Ampadu et al. (2022) synthesize the impact of tailor-made marketing ads on the customer product value beliefs together with its consequent impact on buying behavior. Advertisers divide the public into segments so that common appeals do appeal emotionally and make appropriate cost and worth performance in consumer minds (Ampadu et al., 2023). Research shows that these value perception elements strengthen consumer selection processes, resulting in spontaneous buying decisions. According to Nablsi (2024), personalized recommendations create emotional responses in consumers that serve as mediators in their purchase choices.

2.4 The Dimensions of Perceived Value: Price, Emotional, and Social Factors

Perception of a product has several dimensions, including perceived price, perceived emotion, and perceived social pressure. The price dimensions give the consumer's perception concerning the cost of a particular product in relation to the benefits that they seek to gain from it (Ali et al.., 2021). Promotional ads always depict some reduced price or offer behind the particular product, making it seem more attractive and likely to be bought impulsively (Kerley, 2024). The affective dimension of perceived value concerns consumers' sentiments, with special ad appeals created to trigger relevant moods like enthusiasm or desperation. Appealing to emotions has been proven to create impulse buying because the buying decision is not generally based on reason but on feelings (Nablsi, 2024). The social context refers to the impact that comes with social signals like celebrity endorsement or fellow consumer influence. Specifically, social proof-based advertisements can significantly improve the social utility of the product and thereby increase impulse purchasing (Ram et al., 2024).

2.5 Personality Traits as Moderators of Impulsive Buying Behavior

Extraversion and agreeableness are the most suitable personality traits that moderate the association between algorithmic ad personalization and impulsive buying behaviour. The self-generated proposition of extroverted individuals who are outgoing and spontaneous will make them respond quickly to the appealing emotions conveyed in the localized ads, which are likely to lead to impulsive buying in response to the personalized ads (Xiong & Tseng, 2024). On the other hand, people who have a high level of agreeableness and are easily influenced by others would be more likely to act in

accordance with the messages in the advertisements, for instance, a celebrity endorsement of a particular product (Ali et al., 2021). Research by Xue, Feng, and Wu (2024) also indicates that consumers' personality characteristics, which include self-control when purchasing products, have a significant influence on impulsive buying since extroverts have low self-control.

2.6 Impulse Buying Behavior: The Role of Emotional and Cognitive Responses
In the present context, impulse buying behaviour can be defined as a purchase which is not planned or for which prior planning was not seriously considered. They are typically made under emotional and cognitive control by stimuli such as personalized advertisements. Xue, Feng, and Wu (2024) stress that emotions such as excitement or FOMO, especially in the sphere of social commerce, have a significant impact on impulsive buying. Unlike retained, personal appeals that are aimed at provoking these emotions, advertised can cause an immediate and impulse purchase. In the same way, Chap (2022) provides insight into how machine learning helps boost the emotional attitude to advertisements and helps consumers make purchases spontaneously because the products are presented to them in accordance with their preferences.

2.7 Integrating Mediating and Moderating Variables in the Model
The use of the mediating and moderating variables in consideration of impulsive buying behaviour offers a broader outlook on how personalized advertisements affect consumers' decisions. Pre-purchase perceived value mediates between the stimulus, the personalized ads, and the response, which is impulsive buying (Nablsi, 2024). In addition, the moderation of personality or extraversion and agreeableness traits accounts for why one person may respond positively to the targeted advertisement while another may not. According to Xiong and Tseng (2024), preferred attitude and self-presentation impact the personalization of ads, which in turn influence the level of impulsiveness in purchasing.

2.8 Implications for Marketing and Advertising Strategies
This research will be important to marketing practitioners in that they will be able to understand the correlation between algorithmic ad personalization, perceived value, personality traits, and impulsive buying behavior. The link between the presented thesis and further points is using a value-dimensions approach and advertising specialized appeals to emotions and social and price-related values to increase the likelihood of impulse buying (Xiong and Tseng, 2024). Secondly, even personality traits can be helpful for an additional degree of brand targeting through ad campaign refinement. Kerley (2024) noted that any brand that can admit that personalities differ and are reflected in consumer psychology is likely to develop messages in advertisements that will attract specific segments of the population and thus increase yields.

2.9 Theoretical Contributions and Future Research Directions
This research also enhances the growth of consumer behaviour models by applying the S-O-R framework to include mediating variables and moderating variables. The analysis underscores the importance of algorithmic ad personalization in behavioural decision-making processes and the moderating effect of personality on how consumers engage with advertising content (Tania & Oktavia, 2024). It would be beneficial for further research to extend this study by investigating whether other personality characteristics like neuroticism and openness influence impulsive buying behaviour. Further, understanding cultural variation in the impact of personalized ads might also afford a further understanding of the global applicability of algorithm-based advertising.

2.10 Hypothesis
H1: Algorithmic ad personalization has a positive influence on impulsive buying behavior.

H2: The dimensions of pre-purchase perceived value (price, emotional, and social factors) mediate the relationship between algorithmic ad personalization and impulsive buying behavior.

H3: The relationship between algorithmic ad personalization and pre-purchase perceived value (price, emotional, and social factors) is moderated by extraversion such that the effect is stronger for people with high levels of extraversion.

H4: The relationship between algorithmic ad personalization and pre-purchase perceived value (price, emotional, and social factors) is moderated by agreeableness such that the effect is stronger for people with high levels of agreeableness.

H5: The relationship between pre-purchase perceived value (price, emotional, and social factors) and impulsive buying is moderated by extraversion such that the effect is stronger for people with high levels of extraversion.

H6: The relationship between pre-purchase perceived value (price, emotional, and social factors) and impulsive buying is moderated by agreeableness such that the effect is stronger for people with high levels of extraversion.
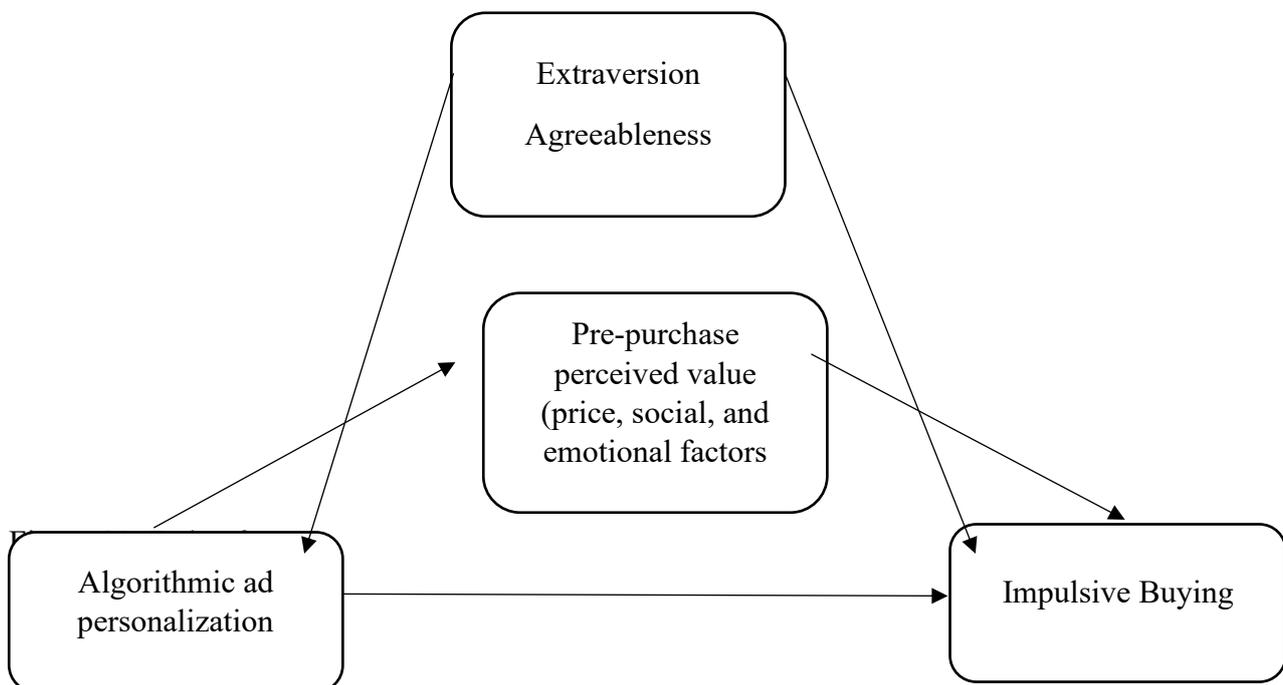
Algorithmic Ad Personalization in Driving Impulse Buying Behavior: Mediating Effects of Perceived Value and Moderating Personality Traits

3. Methodology

The study was systematically conducted to examine the proposed model and assess the role of algorithmic ad personalization in impulse buying behavior, with mediation effects of perceived value and moderating personality traits such as agreeable personality, extraversion, and post-purchase regret as control variable. The study surveyed a sample of 106 at two different time intervals, T1 and T2. Two different time intervals were used to survey the respondents in the study. At T1, respondents completed a demographic section and self-reported their knowledge of algorithmic ad personalization as well as their agreeable personality, extraversion, and post-purchase regret. At T2, the survey focused on perceived value (like its price, emotionally valued, and socially valued) and the primary variable of impulsive buying behavior. This design suggested time intervals that monitored the effects of algorithmic ad exposure on the behavior of respondents to dissipate the concerns typically raised by a lack of temporal separation in terms of standard method bias identifiers (Bell, Harley & Bryman, 2022).

The study will use Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the complex interplay between algorithmic ad personalization and impulse buying while assessing the

mediating influences of value perception and the value-driven and moderating influences of personality traits. PLS-SEM is most suitable for examining multi-dimensional constructs and their relationships while testing both direct and indirect pathways within an overall theoretical model. This method allows a more comprehensive understanding of how consumers' psychological processes activate impulse buying behavior in response to algorithmic ads. Xiong & Tseng (2024) confirm this evidence, despite some individuals being prompted by commercial ads being vulnerable to advertisements because their personality traits determined their behaviour and responses in a commerce engagement activity.

Using measurable constructs of personality traits, value perception, and impulsive buying behaviour means gauging the study's intent through these dimensions, providing complete views of the constructs without limitation. In the study, the author also used a non-probability sampling approach and chose a sample size 106 based on ease of access and availability. The selected sample size allows for adequate generalization for a larger population (Bell, Harley & Bryman, 2022).

4. Results and Discussions
The data collected using questioners was arranged, processed and analysed in PLS-SEM. First of all, Descriptive statistics were analysed in start to find out the behaviour of variables. Furthermore, correlation analysis was done to find out the association of variables and multiple regression analysis was done to find out the direct impacts as well as moderation and mediation as explained below:

4.1 Descriptive Statistics of Respondents
The normality test uncovers differences in skewness and kurtosis for each variable, helping to understand the distributions. Algorithmic Ad Personalization (mean 3.777) is left-skewed (skewness -1.361) and has a larger kurtosis (kurtosis 1.838), meaning the data has an area with a sharper peak and wider extremes. Extraversion and Post Purchase Regret are close to normal, as their graphs are almost flat or show no extreme points (mean 3.938, skewness -0.167, kurtosis -0.969 and mean 3.433, skewness -0.091, kurtosis 0.013). The distribution of societal friendliness is slightly positively skewed and shows low peakedness. Pre-Purchase Perceived Value (Price) has left skewness and a few leptokurtic aspects. The data for Impulsive Buying is left-skewed and has platykurtic features.

Table 1: Descriptive Statistics of Structures Exhibiting Skewness and Kurtosis

	Mean	Std. Deviation	Variance	Skewness	Kurtosis
Algorthemic Ad Persolization	3.777	0.96574	0.933	-1.361	1.838
Extraversion	3.938	0.72866	0.531	-0.167	-0.969
Agreeableness	3.715	0.77038	0.593	0.246	-0.517
Post Purchase Regret	3.433	0.75791	0.574	-0.091	0.013
Pre Purchase Percived Value (Price)	3.875	0.71325	0.509	-0.103	1.714
Pre Purchase Percived Value (Emotions)	3.703	0.67970	0.462	-0.225	.642
Pre Purchase Percived Value (Social)	3.173	0.69708	0.486	-0.427	1.791
Impulsive Buying	3.438	0.79111	0.626	-0.374	-0.425

Overall, the variables in this study exhibit varying degrees of non-normality, with some showing skewness and leptokurtic kurtosis (e.g., Algorithmic Ad Personalization, Pre-Purchase Perceived Value (Price), and Pre-Purchase Perceived Value (Social)), while others, such as Post Purchase Regret and Extraversion, exhibit characteristics closer to normality. These findings suggest that while some deviations from normality are present, they are not severe enough to invalidate the use of statistical techniques like PLS-SEM, which are less sensitive to normality assumptions. However, caution should still be exercised when interpreting results, as non-normal distributions can impact parametric analyses.

4.2 Theoretical Framework and Empirical Investigation

### 4.2.1 Measurement of the Model

The measurement model assesses different constructs based on their reliability and validity. All seven items, GI1-GI7, in Algorithmic Ad Personalization contribute remarkably, as their loadings range from 0.769 to 0.818. Values of Cronbach's alpha (0.903), Composite Reliability (0.904 and 0.924), and AVE (0.633) above 0.70 and 0.50 show high internal consistency, reliability, and convergent validity in our data. With four items for Extraversion and Agreeableness (HB1-HB4), loadings are between 0.793 and 0.834, Cronbach's alpha is 0.825, rho_a is 0.827, rho_c is 0.884, and AVE is 0.656, and everything above threshold, meaning the variables are trustworthy and share similar meaning. The internal consistency and reliability of Impulsive Buying (CA1-CA4) are confirmed by its loadings (0.820 to 0.856), a Cronbach's alpha of 0.860, rho_a and rho_c of 0.861, and an AVE of 0.705.

Table 2: Reliability and validity of the constructs

Construct	Items	Loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Algorithmic_ad_personalization	GI1 GI2 GI3 GI4 GI5 GI6 GI7	0.792 0.797 0.774 0.806 0.818 0.813 0.769	0.903	0.904	0.924	0.633
Extraversion_Agreeableness	HB1 HB2 HB3 HB4	0.834 0.793 0.807 0.807	0.825	0.827	0.884	0.656
Impulsive_Buying	CA1	0.856 0.820	0.860	0.861	0.905	0.705

	CA2	0.844			
	CA3	0.839			
	CA4				
Pre-purchase_perceived_value	FA1	0.806	0.820	0.820	0.881	0.649
	FA2	0.816			
	FA3	0.805			
	FA4	0.797			

To assess the second construct, Extraversion and Agreeableness, four items (HB1-HB4) are used, and their loadings are 0.793 to 0.834, proving reliability as each is above the 0.70 required number. The scale has a Cronbach's alpha of 0.825, is highly reliable with a composite reliability of 0.827 and 0.884, and shows strong agreement with convergent validity (0.656). The four items in the Impulsive Buying construct have loadings between 0.820 and 0.856, all exceeding 0.70, and the Cronbach's alpha is 0.860, rho_a is 0.861, rho_c is 0.861, and AVE is 0.705, all surpassing the required values. It demonstrates that the scale performs well and reliably, showing that it reflects the expected differences in observed items.
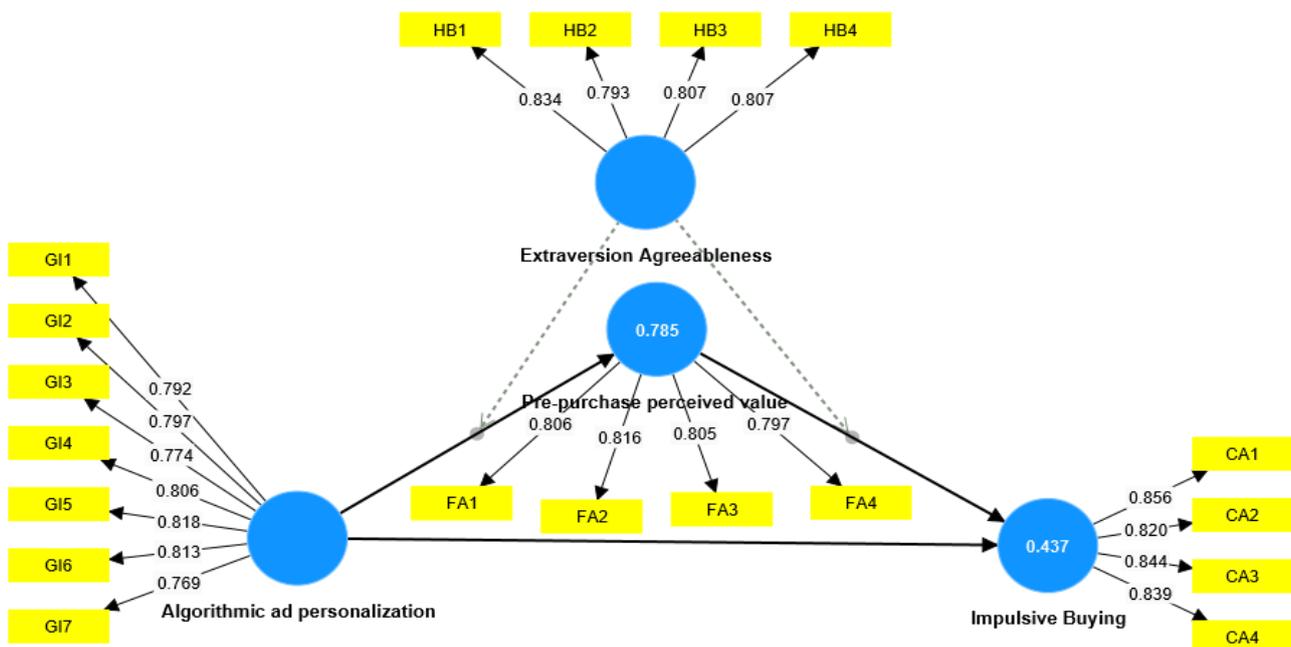
The last construct Pre-Purchase Perceived Value is made up of four items (FA1 - FA4) with item loadings ranging from 0.797 to 0.816 showing that all items loads significantly on the construct. The Cronbach's alpha of this construct is 0.820, representing good internal consistency. The Composite Reliability values of rho_a = 0.820 and rho_c = 0.881 suggest the construct is reliable. There is a good level of convergent validity, with an AVE of Pre-Purchase Perceived Value being 0.649, which is higher than the minimum threshold of 0.50. Overall, all constructs examined in this study have a high relevance and validity, with loadings, Cronbach's alpha, composite reliability, and AVE surpassing the thresholds needed for reliability and validity.

4.2.2 Discriminant Validity

The HTMT method in the matrix pinpoints the important links between constructs in the study. There was a strong, noticeable link between Algorithmic Ad Personalization and Extraversion_Agreeableness (0.759) and Impulsive Buying (0.716). There was also a noticeable link (0.725) between Algorithmic Ad Personalization and Pre-purchase Perceived Value, meaning that personalized ads raise the way consumers value a product before buying it.

Agreeableness and extraversion are moderately correlated with impulse buying, meaning that personality is related to buying things quickly. It was found that Extraversion_Agreeableness and Pre-purchase Perceived Value had a moderate correlation (0.622), meaning those who are extraverted and agreeable tend to assign a higher value to a product just before they make a purchase. Ultimately, a cooperative effect between Extraversion_Agreeableness and Pre-purchase Perceived Value (0.772) was observed on consumers' decisions regarding pharmacy products. This study highlights that certain personality traits and personalized ads do indeed affect consumers' perceptions and influence their buying behavior.

Table 3: Heterotrait-Monotrait Ratio (HTMT)

	Algorithmic_ad_personalization	Extraversion_Agreeableness	Impulsive_Buying	Pre-purchase_perceived_value	Extraversion_Agreeableness x Pre-purchase_perceived_value	Extraversion_Agreeableness x Algorithmic_ad_personalization
Algorithmic_ad_personalization						
Extraversion_Agreeableness	0.759					
Impulsive_Buying	0.716	0.752				
Pre-purchase_perceived_value	0.725	0.622	0.719			
Extraversion_Agreeableness x Pre-purchase_perceived_value	0.710	0.710	0.525	0.772		
Extraversion_Agreeableness x Algorithmic_ad_personalization	0.695	0.653	0.557	0.786	0.770	

The HTMT value for Extraversion_Agreeableness and Algorithmic Ad Personalization was 0.786, meaning they are strongly related. Therefore, it appears that people's personality traits influence the impact of personalized advertising on consumer behavior. Those who are extraverted and agreeable seem more likely to be influenced by personalized ads in their buying habits. Despite their relatedness, the concepts are still considered different from one another. The significant links found between Extraversion_Agreeableness and both types of interaction terms indicate that they are important for studying consumer behavior. This suggests that where a person's personality is involved, personalized ads and impulsive buying may have a stronger or weaker impact on how much value individuals see in such ads. Still, the moderate correlations indicate that there could be

multicollinearity problems in the structural model, so this should be discussed further when analyzing the model in future work.

4.3 Measurement of Structural Model

Table 4: Analysis of Path Coefficients and Statistical Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Algorithmic_ad_personalization -> Impulsive_Buying	0.301	0.299	0.086	3.509	0.000
Algorithmic_ad_personalization -> Pre-purchase_perceived_value	0.474	0.474	0.054	8.762	0.000
Extraversion_Agreeableness -> Impulsive_Buying	0.325	0.327	0.084	3.881	0.000
Extraversion_Agreeableness -> Pre-purchase_perceived_value	0.322	0.321	0.049	6.527	0.000
Pre-purchase_perceived_value -> Impulsive_Buying	0.126	0.128	0.089	1.418	0.000

The finding shows that Impulsive Buying has a moderate positive relationship with Extraversion_Agreeableness, and the effect is considered highly significant. This agrees with previous findings that those who score high in extraversion and agreeableness tend to make purchases driven by their feelings or environment. There is also a significant link between Extraversion_Agreeableness and Pre-purchase Perceived Value, with a path coefficient of 0.322, a T-statistic of 6.527, and a p-value of 0.000. It means that these individuals often think positively about what they are about to purchase. The correlation between pre-purchase perceived value and impulse buying is still strong, with a p-value of 0.000. While its impact is not as high, it still reveals that perceived value is important, and personality traits and ads with personalized offers have a larger effect on impulsive shopping decisions.
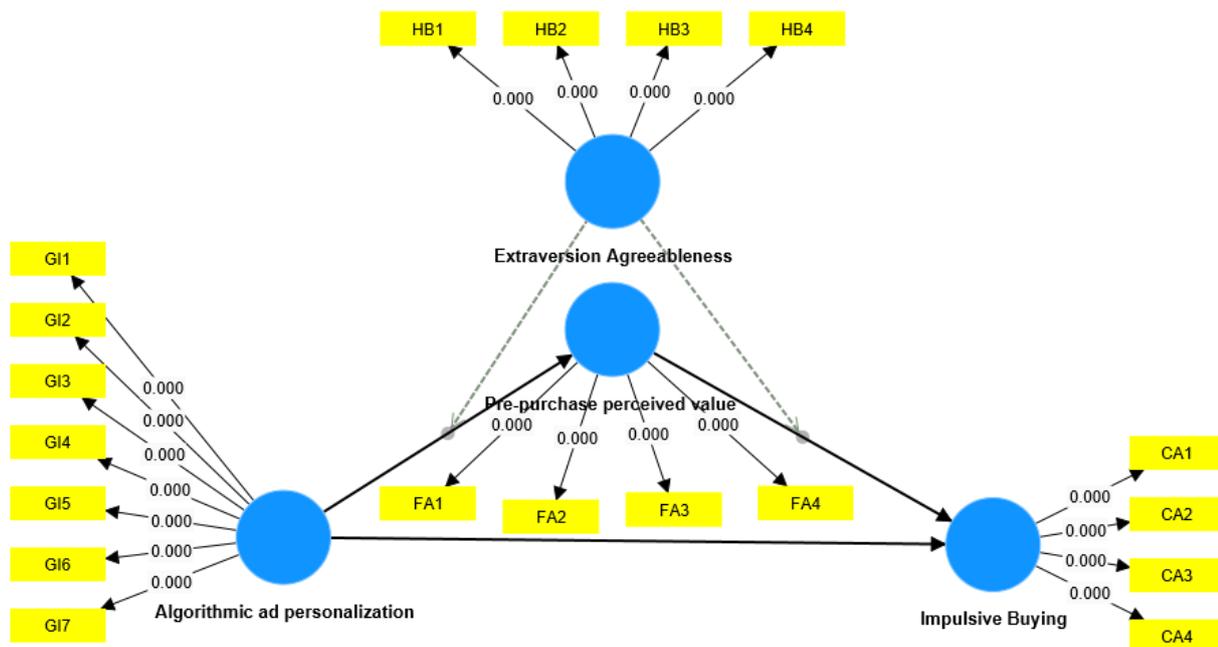
Overall, the findings provide convincing proof that using Algorithmic Ad Personalization and Extraversion_Agreeableness significantly impacts Impulsive Buying and Pre-purchase Perceived Value. The strong relationships between targeted ads and perceived value and impulsive buying, and the personality traits outlined in the study, are important for marketers trying to influence consumer behavior. While there is a weaker correlation of Pre-purchase Perceived Value to Impulsive Buying, it is significant, and after observing it, additional associations may be examined.

4.4 Mediation Analysis of the Study

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Extraversion_Agreeableness x Pre-purchase_perceived_value -> Impulsive_Buying	0.074	0.074	0.057	1.298	0.000
Extraversion_Agreeableness x Algorithmic_ad_personalization -> Pre-purchase_perceived_value	-0.143	-0.142	0.050	2.885	0.004

The mediation analysis of this study explains the indirect effect of Extraversion/Agreeableness on Impulsive Buying and Pre-purchase Perceived Value via the interaction terms of Algorithmic Ad Personalizations. The first path examined was the mediation effect of the interaction between Extraversion/Agreeableness and Pre-purchase Perceived Value upon Impulsive Buying. For this relationship, the path coefficient was 0.074, indicating that the mediation effect is weak but positive. The T-statistic value was 1.298, and the p-value was 0.000, indicating significant statistical evidence for this relationship. The effect size is small, but evidence from the present findings suggests that the interaction of the personality traits (extraversion and agreeableness) and pre-purchase perceptions of value influenced impulsive buying behaviour.

Table 5: Mediation Analysis of the Study

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Extraversion_Agreeableness x Pre-purchase_perceived_value -> Impulsive_Buying	0.074	0.074	0.057	1.298	0.000
Extraversion_Agreeableness x Algorithmic_ad_personalization -> Pre-purchase_perceived_value	-0.143	-0.142	0.050	2.885	0.004

The second mediation path examines the interaction between Extraversion_Agreeableness and Algorithmic Ad Personalization on Pre-purchase Perceived Value. A path coefficient of -0.143 indicates a negative relationship. The negative relationship here indicates that personalized advertising and certain personality traits can lower perceived value (prior to purchase). The path coefficient was statistically significant (T = 2.885 and p < 0.004). While the negative mediation relationships suggest that personalized advertising can influence our perception of enhancing the value of a product, especially when those traits are present. Another issue may be that personalized advertising can overwhelm individuals who are high in extraversion and agreeableness, disengaging from the ad itself and lowering the perceived value of the product.

Discussion

The findings from this study reveal that algorithmic ads greatly influence impulsive buying, which is in line with Hypothesis 1. Ram et al. (2024) also showed that using AI to create personalized ads improves decision-making when buying, since the data allows ads to be relevant to each person. Since perceived value includes emotional, social, and price components, it supports Hypothesis 2 as part of Walsh et al. (2014)'s position on the major role that perceived value plays in consumer behavior. Emotional and social value acted as strong mediators, agreeing with Xue et al. (2024) that emotions like excitement lead to many impulse purchases in social commerce.

According to Hypotheses 3 to 6, extraversion and agreeableness improve these relationships. Ali et al. (2021) report that people who are extroverted and uncontrolled by their emotions tend to respond more eagerly to emotional ads, indicating a connection with compulsive spending. Accordingly, agreeable people, sensitive to their environment, tend to be drawn toward ads using social proof, similar to what Xiong and Tseng (2024) pointed out about the relevance of personality in determining how effective ads are. As Wu et al. (2020) asserted, less influence from perceived value on impulse buying indicates that several psychological factors work together to shape impulsive decisions.

These results using mediating and moderating variables enhance the S-O-R framework to provide more details about why consumers use different digital technologies. When Extraversion_Agreeableness and Algorithmic Ad Personalization interact, the resulting lower rating of perceived value points to a possible risk known as ad overload, which was addressed by Nablsi (2024).

Theoretical Contributions & Practical Contributions

This research enhances the S-O-R framework by adding perceptions of value before the purchase and personality traits into the model. It fulfills Zarouali et al.'s (2021) request for a broader perspective in studies of algorithmic advertising. It contributes to studies on consumer behavior by showing that emotional and social value impact people's reactions to digital ads, building on Chu's earlier discoveries about personalized ads' effects on emotions and mental processes. The results suggest how marketers should design advertisements, watching where extroverted and agreeable consumers shop, as Ali et al. (2021) support. On Instagram, tools can be developed to avoid personalizing content too much, as warned by Nablsi, to prevent users from feeling that the content holds less value.

Limitations and Future Directions

The fact that the study only involved 106 people means its results may not apply to other age groups. Relying on cross-sectional studies does not allow for identifying causal factors, as observed in their suggestion to use longitudinal research for examining how ads can change impulsive buying over time. Lastly, Xiong and Tseng (2024) state that ignoring traits such as neuroticism or conscientiousness may mask important aspects of a person's personality. Increasing the sample size and adding the suggested traits would help enhance model reliability, supported by Tania and Oktavia (2024), who believe in the importance of analyzing more aspects of personality. The authors recommend increasing the precision of outcomes and understanding how ad personalization affects people from different cultures using longitudinal and experimental approaches, as recommended in current studies.

5. Conclusion and Recommendations

The objective of this research was to evaluate how algorithmic advertisement personalization affects impulsive purchase tendencies with mediation of pre purchase perceived value (price, emotional, social) and moderation of personality traits extraversion and agreeableness. The results substantiate that algorithmic ad personalization have an impact on impulsive buying behavior, which is consistent with the hypothesis. This is in line with earlier studies that claim personalized ads do have profound effect in decision making, but not as simple as that, other sociopsychological factors need to be understood and controlled (Ram, Maryam & Bernard, 2024). More specifically, emotional and social

values, which mediate the relationship between personalized ads and impulsive buying commercially, emerge as strong influences, supporting the work of Walsh et al. (2014) on the issue of perceived value and consumer intentions to purchase. The personality traits of extraversion and agreeableness moderated, indicating that the effects of trait extraversion and trait agreeableness on impulsive buying behavior are stronger with the effects of personalization on the advertisement awareness. These traits enable the easier adoption of personalized advertising and therefore lead to greater reckless spending (Tania & Oktavia, 2024).

The research claimed that emotional and social perceived value significantly correlates with the engagement in impulsive buying behavior, which is consistent with former studies that indicate these two facets contributed considerably to online impulse purchases (Xue, Feng, & Wu, 2024). On the other hand, the impact of algorithmic ad personalization on impulsive purchasing was weak in this case, which implies that other factors like personality traits and value perceptions might strengthen and weaken the impact of ad personalization on consumer behavior (Wu, Chiu, & Chen, 2020). It also supports the position of Xiong and Tseng (2024) that the behavior of consumers is determined not only by the advert but by the client's individual psychological and sociological factors.

In order to improve the generalizability of the results, it is recommended that future studies increase the sample size. It may also be beneficial to examine other aspects of personality such as neuroticism or conscientiousness, as they would greatly enhance the understanding of the interaction between advertising personalization and the various components of personality (Xiong & Tseng, 2024). Longitudinal studies may facilitate a better comprehension of the chronic impact of algorithmic ads on impulsive purchasing behaviors in regard to the consumer's brand loyalty and perception (sensitivity) of the brand. In addition, the inclusion of such experimental approaches would strengthen the causal conclusions regarding the effects of personalization of algorithmic advertising on impulse purchase behavior (Ram, Maryam, & Bernard, 2024). These algorithms should be studied from the perspectives of cultural differences as well as digital literacy of consumers, especially when it comes to the phenomenon of impulsive buying, to provide a broader explanation of the phenomenon.

References

Ali, F., Tauni, M. Z., Ali, A., & Ahsan, T. (2021). Do buyer–seller personality similarities impact compulsive buying behaviour?. *Journal of Consumer Behaviour,* 20(4), 996-1011.

Ampadu, S., Jiang, Y., Debrah, E., Antwi, C. O., Amankwa, E., Gyamfi, S. A., & Amoako, R. (2022). Online personalized recommended product quality and e-impulse buying: A conditional mediation analysis. *Journal of Retailing and Consumer Services*, 64, 102789.

Bell, E., Harley, B., & Bryman, A. (2022). *Business research methods*. Oxford university press.

Chap, C. (2022). How Machine Learning Artificial Intelligence Improves Users' Perceptions of Facebook Ads: A Model of Personalization, Advertising Value and Purchase Intention. Ohio University.

Chen, S., Zhi, K., & Chen, Y. (2022). How active and passive social media use affects impulse buying in Chinese college students? The roles of emotional responses, gender, materialism and self-control. Frontiers in Psychology, 13, 1011337.

Chu, J. (2023). The Effects of Personalized Advertisements on Consumer Decision-Making Behavior. *International Journal of High School Research*, 5(3).

Kerley, T. (2024). Digital Influencers' Visual Narratives and Algorithmic Power: Identity Construction and Impulsive Consumption on Social Networks. *International Journal of Scientific Management and Tourism*, 10(6), e1196-e1196.

Nablsi, R. (2024). "Buy Now, Think Later?": The AI Product Recommendations Effect: From Impulse Buying to Post-Purchase Emotions.

Nazir, S., Khadim, S., Asadullah, M. A., & Syed, N. (2023). Exploring the influence of artificial intelligence technology on consumer repurchase intention: The mediation and moderation approach. Technology in Society, 72, 102190.

Ngo, T. T. A., Nguyen, H. L. T., Nguyen, H. P., Mai, H. T. A., Mai, T. H. T., & Hoang, P. L. (2024). A comprehensive study on factors influencing online impulse buying behavior: Evidence from Shopee video platform. Heliyon, 10(15).

Ram, M., Maryam, P., & Bernard, A. T. (2024). Beyond the Click: Unveiling the Influence of AI Personalization on E-commerce Impulse Buys.

Tania, J., & Oktavia, T. (2024). A Bibliometric Analysis of Key Drivers of Online Impulse Buying Behavior. Journal of System and Management Sciences, 14(5), 489-508.

Walsh, G., Shiu, E., & Hassan, L. M. (2014). Replicating, validating, and reducing the length of the consumer perceived value scale. *Journal of Business Research*, 67(3), 260-267.

Wu, L., Chiu, M. L., & Chen, K. W. (2020). Defining the determinants of online impulse buying through a shopping process of integrating perceived risk, expectation-confirmation model, and flow theory issues. *International Journal of Information Management*, 52, 102099.

Xiong, Y., & Tseng, C. J. (2024). The Impact of Social Media Influencer Characteristics on Purchase Intentions: A Moderated Mediation Effect of Regulatory Focus to Perceived Uniqueness. *Journal of System and Management Sciences*, 14(1), 527-546.

Xue, Y., Feng, T., & Wu, C. (2024). How technical and situational cues affect impulse buying behavior in social commerce? Evidence from bored consumers. Frontiers in Psychology, 15, 1405189.

Zarouali, B., Boerman, S. C., & de Vreese, C. H. (2021). Is this recommended by an algorithm? The development and validation of the algorithmic media content awareness scale (AMCA-scale). *Telematics and Informatics*, 62, 101607.