



## Neuromarketing-Based Analysis of Uzbek Fashion Advertising on Social Media

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### Abstract

It shapes the neural response being measured and influences how advertisements are perceived and remembered. Consumer engagement for fashion products and services at social media platforms is significantly affected by cognitive and emotional factors. The aim of this study was to identify the level of advertising effectiveness and its five dimensions namely visual attention, emotional response, brand recall, message clarity, and purchase intention in Uzbek fashion advertisements on social media. The main purpose of this study was to explore Uzbek consumers' perceptions of their cognitive reactions and purchasing behavior within their recent years as active social media users. This study used a quantitative design involving an analytical process of four cycles: data collection, criteria evaluation, PROMETHEE ranking and regression analysis. A total of 150 social media users from Tashkent city were purposely selected and surveyed to obtain their responses on the fashion advertisements they received before and after their social media exposure and the strategies that they employed within their purchase decision-making process. The results indicate that the PROMETHEE-based ranking approach adopted in this research reasonably enabled consumers to be actively engaged in their purchasing decision process and increased brand awareness among them. The resultant regression-based model showed a better fit to the observed data, providing support for the predictive validity of the regression-based model. The findings and the implications for the improvement of fashion brands' marketing strategies are discussed. This study offers some theoretical and practical implications for improving the marketers' advertising campaigns and their strategic development which aim to enhance the persuasive qualities of future fashion advertisements.

**Keywords:** *Neuromarketing, Fashion Advertising, Social Media Marketing, PROMETHEE Method, Advertising Effectiveness, Purchase Intention, Consumer Engagement (Uzbekistan)*

### 1. Introduction

Many studies seem to just reproduce and apply new measurement scales presented or made available by the neuromarketing literature, while their relevance in the fashion advertising context is quite low [1]. It is only when factorial validity is clearly demonstrated that the proposed combinations of the indicators to form dimensions of advertising effectiveness variables, i.e., the five dimensions, can be fully

justified and the contribution of advertising effectiveness from social media exposure determined [2]. According to [3], neuromarketing theory differs from traditional marketing because it does not focus on the consumers' demographics or income, but suggests that marketers should design, adapt, refine, and personalize content in different social media contexts with the aim of enhancing the consumer's engagement. In this context, it is believed that consumer engagement is a dynamic process in which individuals tend to adapt and change their attitudes to fit their social environment and personal beliefs, values, preferences and habits, which also facilitates the adjustment process for an individual when joining an online community, brand page or digital platform.

The lack of consumer involvement in a data-driven advertising approach seems to be related to the limited application of neuromarketing techniques in developing a more effective communication strategy. In a recent study, [4] revealed that most fashion brands noted that they had lacked support in terms of consumer insights and have had to create their own content strategies and engagement tactics to differentiate themselves within the digital marketplace. In this regard, studies into consumer behavior [5,6] have also highlighted that fashion brands will face challenges and are not expected to fulfill their persuasive role without any clear guidelines, strategies and supportive tools in place within their marketing campaigns. On the contrary, other researchers [7] have argued that most consumers had to rely on "trial and error" after being exposed as potential buyers unless they received adequate support from digital marketers within their early years of online shopping. While the previous studies on consumer engagement and decision-making through cognitive responses and emotional reactions claim to be quite reliable, the implementation of these kinds of measurement techniques in our context raises quite significant practical concerns among researchers; hence neuromarketing analysis does not apply in every cultural setting. Additionally, several studies such as [8], [9], [10], [11], [12] suggest that consumer purchase intention should be further investigated. The existing research literature mostly focused on investigating the impact of advertising stimuli with eye-tracking as a method of measurement; some are mentioned in Table 1. "The advertising effectiveness model shown in Figure 1 is much closer to the one proposed in previous research, except that purchase intention was added as another variable since the focus of the present study was on the role of cognitive and emotional factors involved in the decision-making process."

It is acknowledged and accepted with caution that this kind of traditional form of survey and self-reported method is neither sufficient nor fully reliable. "There had been comments that such a model of consumer assessment did not claim a direct relationship between emotional response and the potential of purchase intention out of brand exposure [13]." Research on social media users' perceptions and their psychological wellbeing needs have not been widely examined in fashion advertising studies, and not many investigations have been conducted on these two dimensions, more so in the Uzbek context. "However, given the increasing importance of social media marketing, and yet the persistent practical problems of consumers dropping out of such online engagement, the present research felt that it was particularly important to also test this proposed model on the perceptions of fashion advertisements found among social media users in the Uzbek context as well." As this study aimed to provide empirical evidence for the valid use of the PROMETHEE-based ranking approach, the research questions that guided the design of this study are as follows: "As mentioned earlier, this study was aimed at developing a regression-based model applicable in the context of fashion advertising [14]." By implementing data-driven techniques, this research aims to improve current understanding in a highly competitive product class to ensure that visual attention, emotional response, and message-based clarity as well as cross-channel consistency among fashion brands and across social platforms. Given these points, the present study will at least provide more insights and guidance for marketing practitioners and academic researchers with regard to consumers' cognitive responses and emotional reactions and also their purchase decisions.

In this study, we employ survey-based data collection activities to meet this objective, whereby all evaluation criteria are built on prepared and conducted questionnaires by the researchers. "On the basis of the principles of neuromarketing, the effects of the criteria (visual attention and emotional response) working in combination were hypothesized to be influenced by message clarity and brand recall, which (a) would directly affect engagement and recall, and (b) would indirectly shape purchase intention because of cognitive processing." We develop a more comprehensive and reliable multi-criteria model by adding several significant contributions to the literature, such as the integration of regression analysis, neuromarketing indicators, and the use of social media platforms as a primary data source instead of as a secondary reference. "The PROMETHEE-based ranking model shown in Table 2 is much closer to the one used in [14], except that message clarity was added as another variable since the focus of the present research was on the role of visual stimuli involved in the brand evaluation process."

## 2. Methods

The samples were chosen from a population of social media users from the capital city (Tashkent), which was randomly determined and not according to personal acquaintance to avoid any sampling bias [15]. The questionnaire items were developed using a five-point Likert scale which was developed based on the conceptual definition of advertising effectiveness, as outlined in the previous studies. Three intact groups of an undergraduate marketing course consisting of 28 students in the first group and 30 students in the second group participated in this research as part of pilot-testing activities. These students were chosen from the same city as the main respondents so that the consistency between the level of clarity and the integration of their feedback by the researchers could be measured. A total of 150 respondents were also chosen from a population of active social media users in Tashkent, based on [1]. From a total of 160 questionnaires that were randomly selected, 150 were found suitable, and rated by an expert panel. In this study, the respondents were chosen through a purposive sampling technique in selecting those who have social media accounts that are active in following the fashion advertisements on Instagram and Facebook. Second, it is the most commonly used method, and thirdly, it can be used with sample sizes of between 100 and 200 [3].

The sampling method used in this study was 'simple random sampling' where each advertisement in the population has the same chance to be selected as a sample [4]. This procedure uses a simple systematic process of selecting each individual in the sampling-frame until the desired number of samples is achieved [5]. The samples were chosen from a group of frequent users from the online fashion community (Tashkent-based), which was deliberately targeted and not according to convenience sampling to avoid any bias [6]. These experts were chosen from the same academic field as the researchers so that the agreement between the overall level of importance and the interpretation of meaning by the respondents could be measured. Online questionnaires and direct observation were used to collect numerical data and open-ended responses and other insights that were revealed during the survey process. During the data collection process, all the questionnaires and consent forms were distributed using a secure online platform after consent was obtained from the respondents. The evaluation criteria were analyzed with the PROMETHEE method (Preference Ranking Organization Method for Enrichment Evaluations), which is based on outranking relations by the researchers who developed it [7] to measure advertising effectiveness. The respondents' perception was measured using a questionnaire constructed from the advertising effectiveness model [8].

PROMETHEE uses an outranking approach and is generally thought to involve a cycle of repeated stages of the following: defining the evaluation criteria, assigning weights to each criterion, constructing preference functions and computing net outranking flows, ranking the alternatives, defining the criteria again, assigning the weights again, and so on. At the initial stage of the PROMETHEE process, several advertisements were randomly selected and rated by another group of respondents. Re-specification of the model was guided by theoretical considerations and relevant empirical findings. A research assistant

administered the questionnaire during data collection sessions when the main researchers were not present in the field. The researchers' results of the pilot study showed that the items were valid and reliable [9]. A change of 0.05 in R-squared is indicative of a significant difference in models.

Goodness of fit of the model was established by comparing the output of the regression model to the data. Comparison of the regression models was determined primarily using the change in R-squared per change in degrees of freedom between the models. The dependent variables were respondents' perceived advertising effectiveness, the five constructs of consumer engagement which are visual attention, emotional response, brand recall, message clarity, and purchase intention. For a model to be identified, "a unique solution for each of the parameters in the model" must be achieved [10, p. 153].

In the last stage, conclusions were drawn based on the PROMETHEE rankings and regression results. Construct validity of the model was established by testing the assumptions of the proposed model to the data. In this process, the responses were categorized into small units according to their similarity and relevance. All the criteria were categorized and respectively assigned a weight. Selection of the best-fitting models was determined primarily using the change in adjusted R-squared per change in the number of predictors between the models. Change in chi-square was also used to determine differences in model fit in the regression analyses as it has been shown to be an accurate indicator [11]. The Statistical Package for the Social Sciences (SPSS) software was used for the regression analysis, and means, standard deviations, and frequencies were used to describe the characteristics of the data. Four stages were employed to analyze the data: data collection, criteria evaluation, PROMETHEE ranking and regression analysis as suggested by [12] using the multi-criteria decision-making approach. One of the advantages of using PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluations) is that it can measure the effect of a given criterion on the relationship between consumers' purchase intention and brand preference among respondents in the sample. The study was based on the quantitative approach in which most of the data were analyzed through statistical approaches.

After the pilot study, a few modifications were adopted to analyze the survey data. As the initial regression model produced poor model-data fit, it was re-specified and re-tested. This was followed by the process of refinement based on the feedback and suggestions that emerged from the pilot processes. The R-squared value computed by the regression model was found to be statistically significant.

### 3. Results

The findings revealed that advertising effectiveness and all its five dimensions show high category means in the descriptive statistics, around 4.00. The re-specified final/best-fitting model produced the best fit to the data (Table 1) with no significant R-squared difference change.

**Table 1.** Linear regression

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
visual_attention							
emotional_response	-.205	.081	-2.52	.014	-.367	-.043	**
brand_recall	-.225	.057	-3.95	0	-.339	-.112	***
message_clarity	-.599	.123	-4.88	0	-.844	-.354	***
neural_framing_index	-.082	.031	-2.67	.009	-.143	-.021	***
eye_fixation_durat~n	.01	.016	0.63	.534	-.022	.042	
subconscious_affin~x	.019	.043	0.43	.668	-.068	.105	
social_media_expos~e	.009	.028	0.32	.751	-.048	.066	
purchase_intention	.578	.076	7.64	0	.427	.73	***
Constant	50.705	12.953	3.91	0	24.878	76.531	***

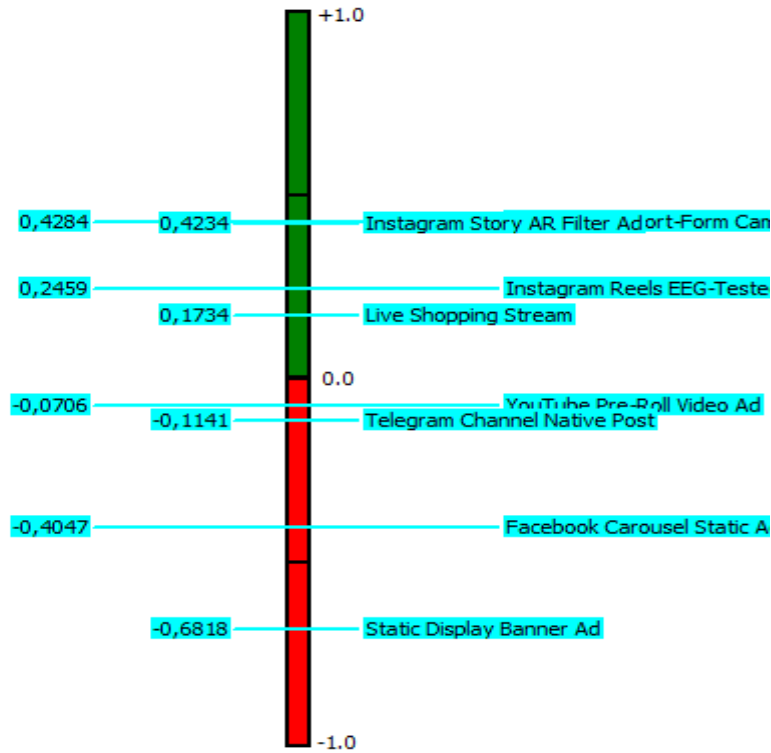
Mean dependent var	68.762	SD dependent var	9.575
R-squared	0.477	Number of obs	80
F-test	8.107	Prob > F	0.000
Akaike crit. (AIC)	553.575	Bayesian crit. (BIC)	575.013
*** $p < .01$ , ** $p < .05$ , * $p < .1$			

The equation indicated that one unit change in purchase intention would increase the level of visual attention in the respondents by 0.578 units, with  $p = 0.000 < 0.01$ , thus the relationship between purchase intention and visual attention is significant. Altogether, for the regression model it was revealed that message clarity had the most significant total effect (-0.599) on visual attention, indicating that message clarity was the variable that was most strongly associated with the dependent variable, followed by purchase intention (0.578), brand recall (-0.225), emotional response (-0.205) and neural framing index (-0.082).

**Table 2.** Promethee Flow table

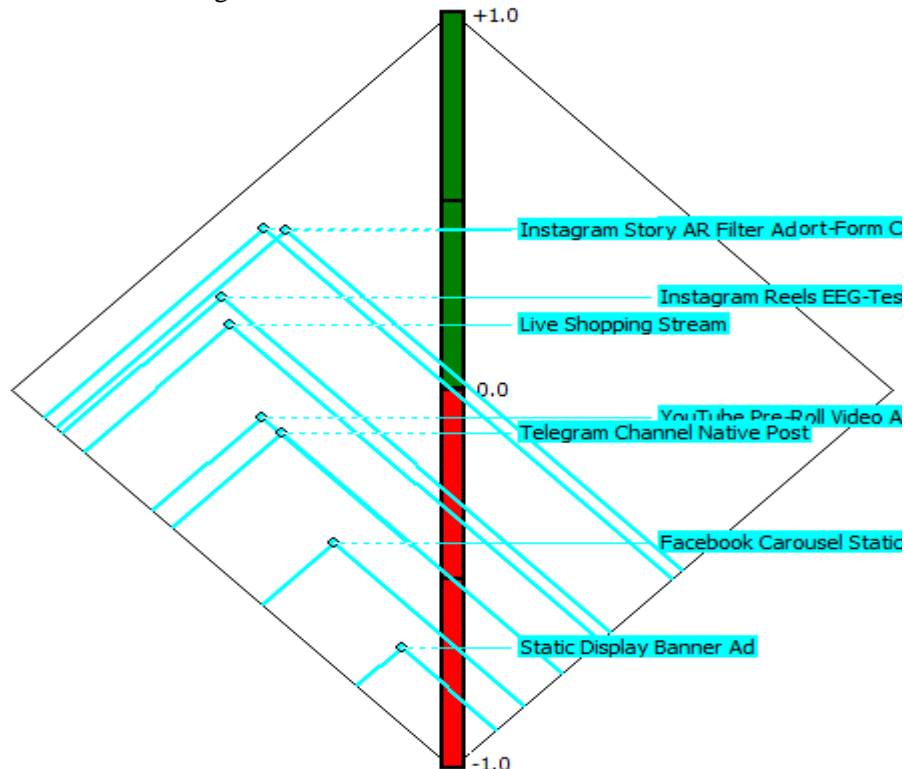
Rank	action	Phi	Phi+	Phi-
1	TikTok UGC Short-Form Campaign	0,4284	0,5007	0,0723
2	Instagram Story AR Filter Ad	0,4234	0,5226	0,0991
3	Instagram Reels EEG-Tested Influencer Campaign	0,2459	0,3609	0,1150
4	Live Shopping Stream	0,1734	0,3351	0,1617
5	YouTube Pre-Roll Video Ad	-0,0706	0,2491	0,3197
6	Telegram Channel Native Post	-0,1141	0,2491	0,3632
7	Facebook Carousel Static Ad	-0,4047	0,1631	0,5678
8	Static Display Banner Ad	-0,6818	0,1014	0,7832

The findings in the descriptive statistics show that the purchase intention construct had the highest mean followed by message clarity, brand recall in descending order, and emotional response respectively; the lowest was visual attention construct but it had the highest standard deviation (1.342). In her initial survey, a researcher faced many challenges with regard to distributing respondents' questionnaires in which only some respondents were provided with a high number of items, leaving behind other groups with fewer responses.



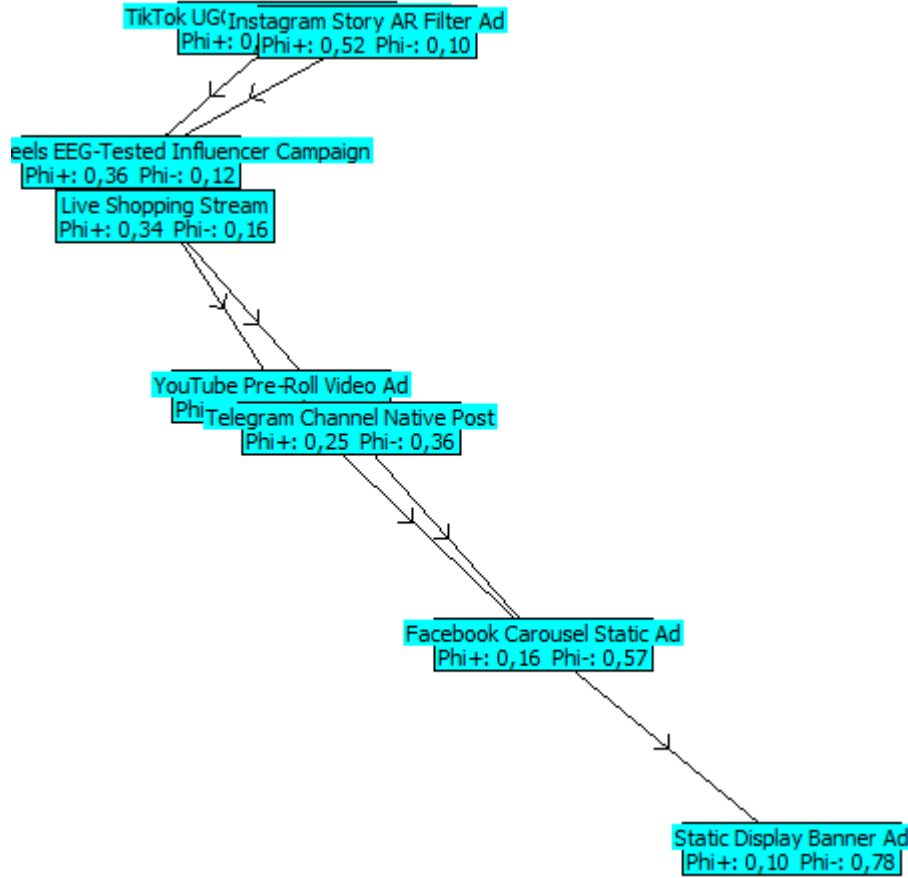
**Figure 1. PROMETHEE Rankings**

In the present study, the p value for testing of the significance was obtained by running 5,000 bootstrap samples from the original data set. Figure 2 provides the path coefficients and t statistic where the t value greater than 1.96 is considered significant at the 0.05 level.



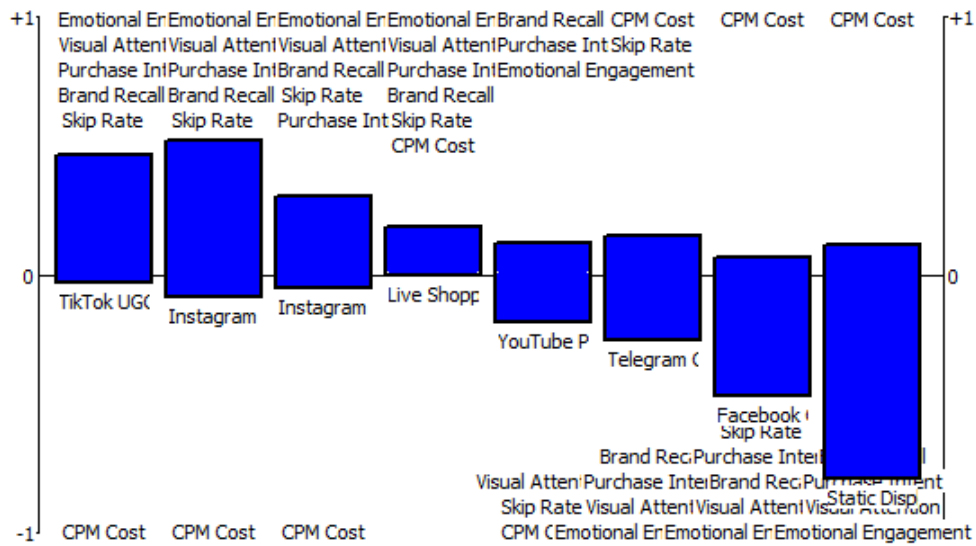
**Figure 2. PROMETHEE Diamond**

If the re-specified models produce better fit to the data and show a non-significant R-squared difference change, it can be concluded that the more parsimonious models perform better and demonstrate stronger predictive validity.



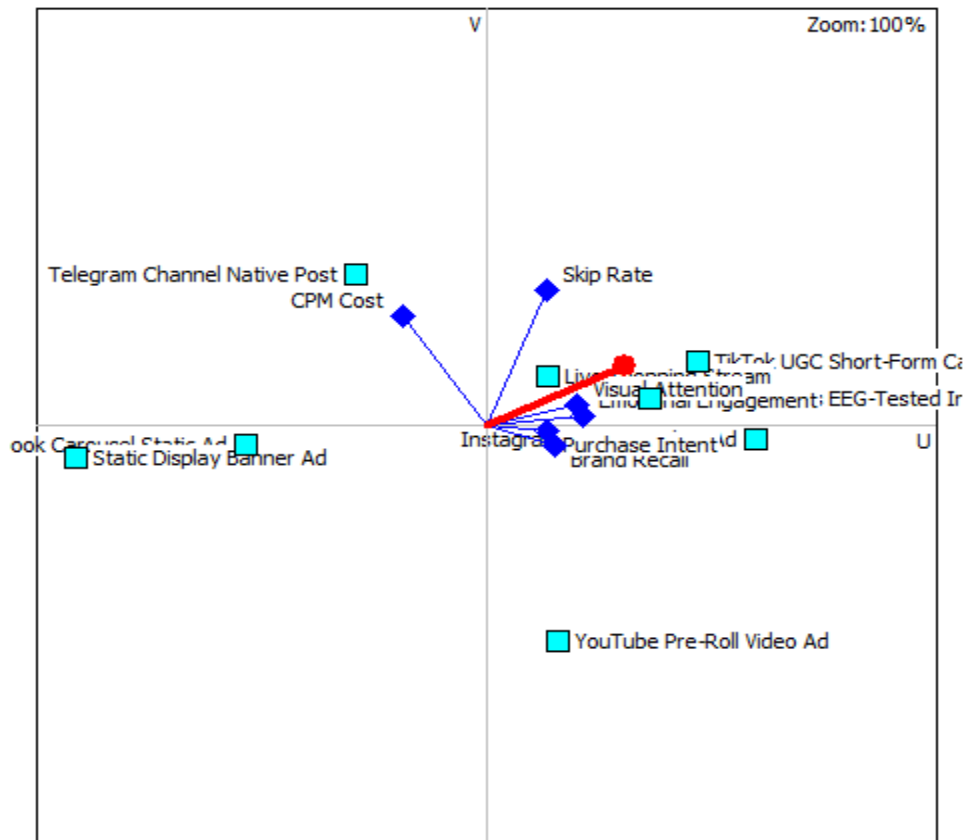
**Figure 3.** PROMETHEE Network

It reported a statistically significant negative effect and supported Hypothesis 2 [2], indicating that if respondents experienced enhanced brand recall, it would have a negative effect on their visual attention.



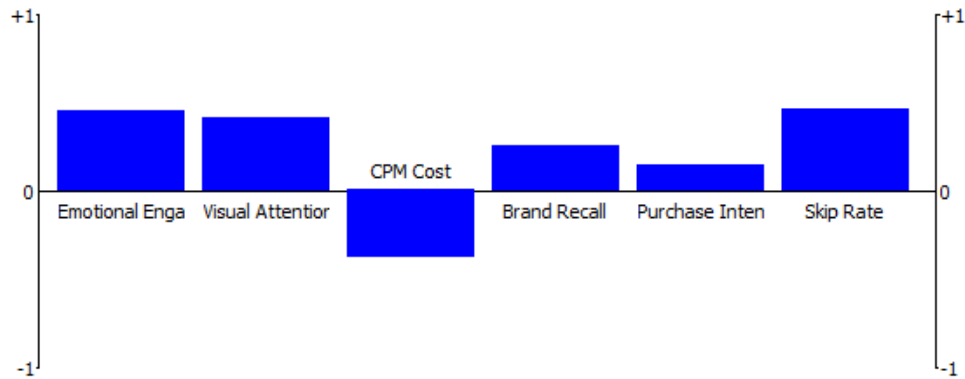
**Figure 4.** PROMETHEE Rainbow

The model summary shows that when social media exposure is not carried out by the respondents, the effect of it as a predictor is not significant in the relationship between social media exposure and visual attention,  $t(71) = 0.32, p > 0.05$ .



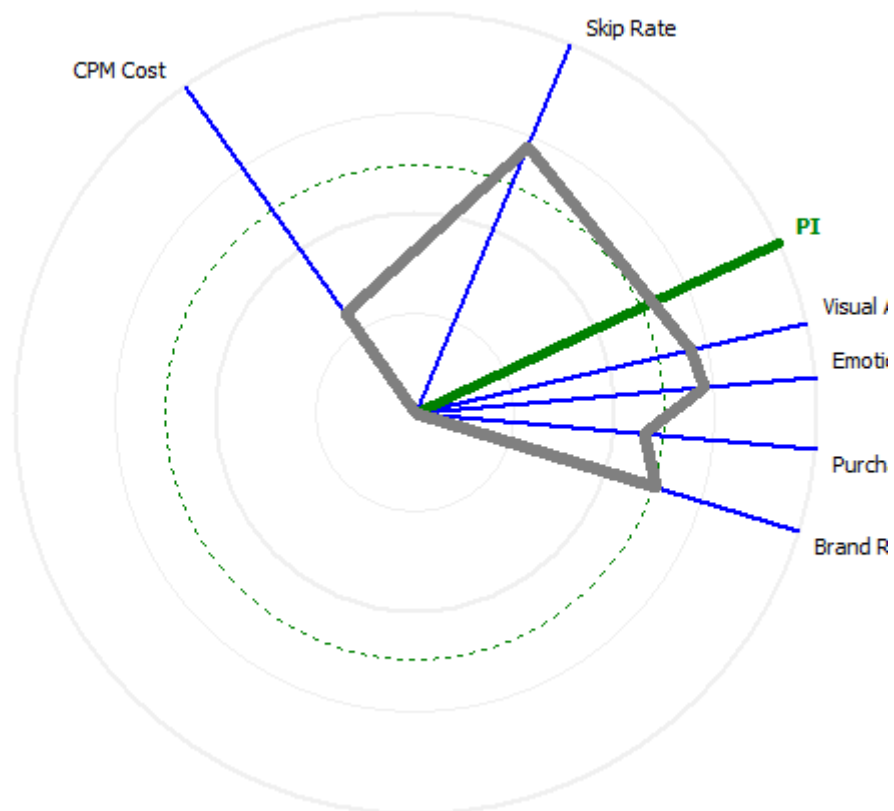
**Figure 5.** GAIA

However, between purchase intention and visual attention, the direct effect was significant ( $\beta = 0.578, p < 0.01$ ), indicating that it was more significant than the indirect effect of message clarity.



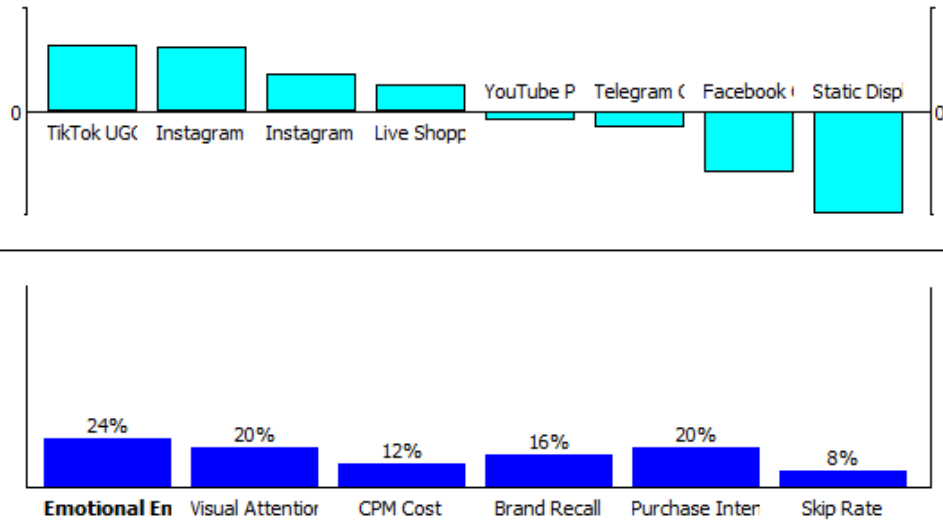
**Figure 6.** Action profile

From Table 1, it is evident that all five constructs, with the exception of message clarity, were not significantly different across the initial and re-specified model.



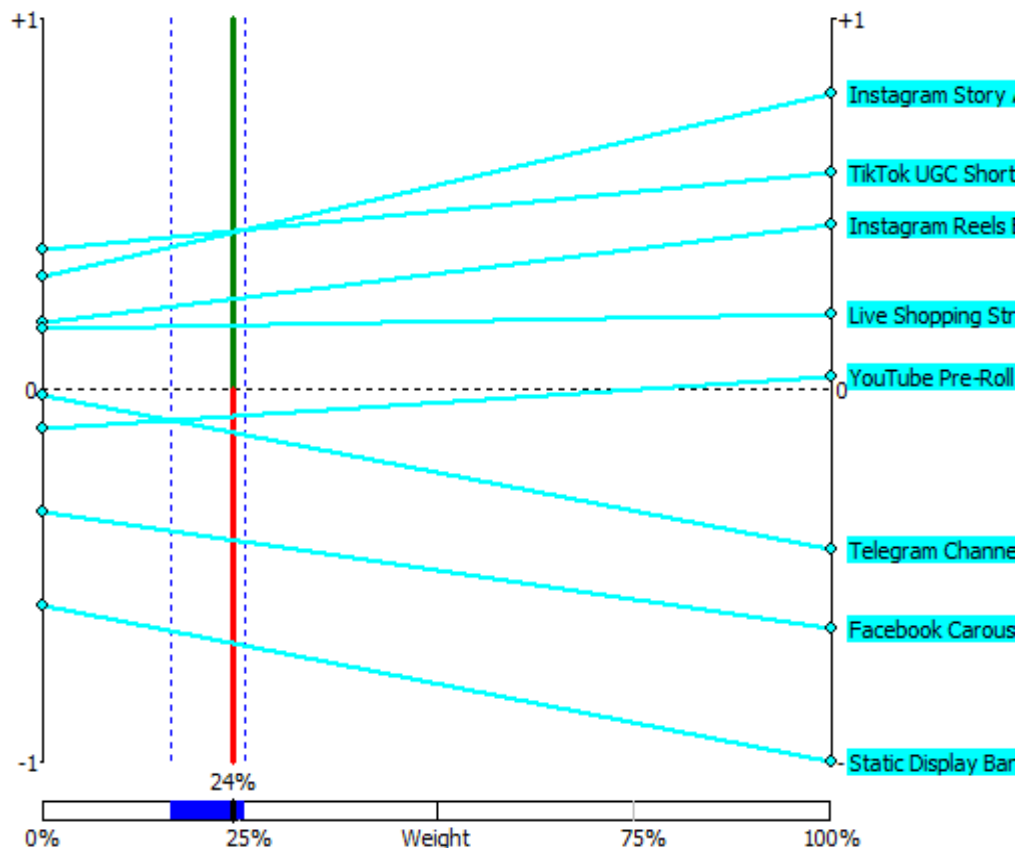
**Figure 7.** GAIA Web

Finally, the path coefficient between message clarity and visual attention was  $\beta = -0.599 (t = -4.88, p < 0.01)$  which reported a statistically significant negative effect and supported Hypothesis 3 [3], indicating that enhanced message clarity would have a negative effect on visual attention.



**Figure 8.** Walking Weights

The model summary shows that when eye fixation duration is not carried out by the respondents, the effect of it as a moderating variable is not significant in the relationship between eye fixation duration and visual attention,  $t(71) = 0.63$ ,  $p > 0.05$ .



**Figure 9.** Visual Stability Intervals

For the test of significance (bootstrapping), the strength of the related path between an independent variable and the dependent variable is determined through the t value which is obtained from bootstrap resampling methods.

	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<b>Scenario1</b>	Emotional En...	Visual Attent...	CPM Cost	Brand Recall	Purchase Int...	Skip Rate	
Unit	score	%	USD	%	score	%	
Cluster/Group	◆	◆	◆	◆	◆	◆	
<b>Preferences</b>							
Min/Max	max	max	min	max	max	min	
Weight	3,00	2,50	1,50	2,00	2,50	1,00	
Preference Fn.	V-shape	Linear	V-shape	Gaussian	Level	Linear	
Thresholds	absolute	absolute	absolute	absolute	absolute	absolute	
-Q: Indifference	n/a	4,00	n/a	n/a	1,00	3,00	
-P: Preference	20,00	20,00	1,20	n/a	2,00	15,00	
-S: Gaussian	n/a	n/a	n/a	13,80	n/a	n/a	
<b>Statistics</b>							
Minimum	25,00	20,00	0,60	18,00	2,00	8,00	
Maximum	88,00	75,00	4,50	60,00	5,00	50,00	
Average	64,13	53,88	2,42	45,13	3,75	24,13	
Standard Dev.	19,81	16,97	1,31	13,83	0,97	15,62	
<b>Evaluations</b>							
<input checked="" type="checkbox"/> Instagram Reels ...	<input type="checkbox"/>	78,00	65,00	3,20	52,00	4,00	12,00
<input checked="" type="checkbox"/> TikTok UGC Shor...	<input type="checkbox"/>	82,00	70,00	2,80	58,00	5,00	8,00
<input checked="" type="checkbox"/> Facebook Carou...	<input type="checkbox"/>	45,00	38,00	1,50	30,00	3,00	35,00
<input checked="" type="checkbox"/> YouTube Pre-Roll...	<input type="checkbox"/>	68,00	55,00	4,50	60,00	4,00	45,00
<input checked="" type="checkbox"/> Telegram Chann...	<input type="checkbox"/>	55,00	48,00	0,80	40,00	3,00	10,00
<input checked="" type="checkbox"/> Instagram Story ...	<input type="checkbox"/>	88,00	75,00	3,80	55,00	5,00	15,00
<input checked="" type="checkbox"/> Static Display Ba...	<input type="checkbox"/>	25,00	20,00	0,60	18,00	2,00	50,00
<input checked="" type="checkbox"/> Live Shopping St...	<input type="checkbox"/>	72,00	60,00	2,20	48,00	4,00	18,00

#### 4. Discussion

Based on this finding, it is clear that some core dimensions of advertising effectiveness, namely message clarity and purchase intention, have been identified by the study's regression analysis to have the strongest effect on consumers' visual attention, in order to provide fashion brands with the evidence and direction needed in designing more persuasive social media campaigns. Overall, this model as carried out in the present study has supported the findings obtained in the previous models used in the neuromarketing literature on social media advertising [2,15]. This resulted in the fourth change of the regression model: respondents' visual attention was mainly determined based on their perceptions of message clarity and purchase intention, and not based on their levels of social media exposure and eye fixation duration. It suggests that the predictors retained are the same in each model and allows for the comparison between the initial and the re-specified models. The study showed that with message clarity as a predictor, the relationship between message clarity and visual attention for prediction purposes was significant ( $\beta = -0.599, p < .01$ ). Moreover, the present model showed a greater variance ( $R^2 = 0.477$ ) in

contrast to the previous model (without purchase intention) by adding one more predictor, which increased the overall proportion of explained variance.

As this was a cross-sectional study, it is suggested that future researchers use a longitudinal approach to obtain more conclusive findings on the relationship between message clarity and visual attention and the effect of brand recall as a moderating variable. "Through the open-ended responses, the respondents negatively remarked about the inconsistency related to the advertisements they received, which they described as lacking in coherence across posts, platforms and campaigns when compared with other brands' advertisements." Almost all respondents in this study ( $n = 150$ ) suggested that exposure to clear and visually engaging advertisements helped them understand the brand's message better. This result to some extent indicates that by providing a clearer structure in their advertising content, fashion brands will help consumers become more attentive and responsive in their own purchase decision-making process and, thus, become more informed buyers. As a result, we can conclude that a brand's ability to deliver clear and emotionally engaging messages on social media indirectly helps increase the level of visual attention and purchase intention among consumers in the online fashion market by making the message easier to follow. Thus, it would seem that if message clarity was improved, consumers' visual attention would be enhanced and would affect their brand recall or their purchase intention more significantly.

The findings also are consistent with neuromarketing theory and meet the standard set for personalized content to support consumer engagement in social media advertising.

"In terms of theoretical implications, this study strongly supports the advertising effectiveness model and provides a basis for improving future neuromarketing models in fashion advertising." The results obviously provide evidence to fashion marketers by showing that consumers will process clear and emotionally appealing advertisements better and gain stronger purchase intention when they come across them in their everyday social media feeds. All of the dimensions of advertising effectiveness except message clarity did not significantly differ between the initial and re-specified models, thus explaining more than 47% of the variance in visual attention in the present study. The study showed that with purchase intention as a predictor, the relationship between purchase intention and visual attention for prediction purposes was significant ( $\beta = 0.578$ ,  $p < .01$ ). The full model accounted for approximately 48% of the variance for visual attention. "More attention on consumers' purchasing-related needs should be implemented with the objective of assisting fashion brands in the early stages of planning their social media campaigns." Clear and emotionally appealing messaging is one effective way for fashion brands to give consumers a positive experience of their shopping journey, as the support would encourage them to engage, explore, and also feel confident about themselves and thus, complete the purchase decision.

This was different from the earlier studies, where eye-tracking data was used only to measure visual attention directly, without linking it to purchase intention. To date, similar multi-criteria evaluation involving PROMETHEE is still fairly limited and is mainly conducted by researchers in other fields, such as operations research and decision science [15]. Findings were also in agreement with Ahmed et al. [2], who found that consumers involved in social media advertising, whose emotional responses were shaped by personalized content, reported high levels of purchase intention. This finding is in line with Oliveira et al. [8], who proved that significant emotional needs were found for all dimensions of brand-generated social media messages, and [9], who supported the role of information experiences in the engagement of consumers with brands' social media accounts. This might have been caused by the inclusion of an additional variable, referred to as purchase intention, which was not considered in the previous models. However, some of the respondents considered this kind of online questionnaire took too much time and that they had limited familiarity with the neuromarketing-related items. Although only a few experienced this, the difficulty could be understood especially among those respondents who were not familiar with

completing five-point Likert scale surveys. However, further studies should be carried out across different cities to obtain more reliable findings for its application.

This study was only carried out in the city of Tashkent, and further research must be done in other cities around Uzbekistan. For example, it mainly relied on self-reported survey responses and did not include other methods of measurement, such as eye-tracking devices, which made it difficult to accurately estimate the effect of any physiological responses. It is recommended that a longitudinal study be carried out for more comprehensive findings. For example, it mainly relied on purposive sampling and did not include other methods of recruitment, such as random sampling across multiple platforms, which made it difficult to precisely estimate the effect of any platform-specific exposure.

## 5. Conclusion

The findings provide further support for the notion that social media learners' development of consumer engagement skills may vary across different platforms or may develop unevenly across the five dimensions of advertising effectiveness. Although it is practical, in terms of research design, to use multi-criteria approaches that combine several constructs, it is important to ensure that the constructs develop together, and therefore will provide a more comprehensive evaluation, especially when there is clear evidence of uneven development in the different dimensions of consumer engagement. In line with the aims of the PROMETHEE-based ranking approach (PROMETHEE) and the regression-based model, the findings of this study suggest that fashion brands who aim to improve their social media advertising campaigns will be able to develop a clearer message, increase consumer engagement and help produce more persuasive content for the online fashion market. The eye-tracking method, for example, can provide more objective, physiological data that can validate the findings from the self-reported questionnaire and hence determine their validity and reliability.

However, the approach, to some extent, caused some respondents to be confused and this was its main limitation. Such studies would investigate whether future respondents also note similar difficulties as their principal concern. Alternatively, since respondents' response also suggested that the exposure to clear and visually engaging advertisements enables them to understand and improve their perception of the brand's message, future research on this topic should to further explore the role of the message clarity dimension in increasing consumers' purchase intention. Future studies may increase the number of cities surveyed in order to yield more comprehensive and reliable data and thus better explain the relationship between message clarity and purchase intention in the context of fashion advertising in Uzbekistan.

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