Gender-Based Differences in Advertising and Implications for Gender-Neutral Approaches

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***Abstract*—**
In the digital era, advertisements significantly shape consumer behaviors and societal views, especially regarding gender norms. This study examines how ads target men and women differently across various fields, including non-traditional ones like finance and parenting. Using a dual-dataset approach, it first analyzed a gender-labeled dataset of ads explicitly aimed at each gender. A neutral dataset from gender-neutral fields was then studied to see if gender-specific marketing persists. The findings highlight the strong influence of ads on gender perceptions and urge the advertising industry to adapt to changing social dynamics where gender roles are increasingly fluid. Future research should investigate the impact of gender-neutral advertising and the role of digital media in shaping or challenging gender stereotypes.
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Introduction

In today's consumer world, advertising on various platforms plays a major role in shaping purchasing behaviors. Advertisements, designed and strategically placed, significantly influence the decisions of the average consumer. The importance of advertisement design cannot be overstated, as it directly affects the perception and attraction of the target audience to the product. Effective advertising not only attracts attention but also drives engagement, ultimately guiding the consumer's journey from interest to purchase. The digital age has brought with it an abundance of advertising platforms, exposing people to hundreds of advertisements throughout their day. Today, individuals are easily influenced, and the ads they encounter can significantly impact not just their consumption habits but also their daily self-perception—dictating what they should wear, eat, and how they should behave. This constant exposure to advertising shapes personal and societal perceptions, subtly setting the norms and expectations of modern life. As people navigate through this barrage of messages, the influence of advertising extends far beyond simple product choices, deeply embedding itself into the fabric of daily decision-making and identity formation. In this research, I will concentrate on gender-based target audiences, acknowledging that the roles of men and women have historically evolved across social, familial, and legal spheres. This evolution has influenced how products are marketed differently to each gender. The goal is to examine whether, even in general domains that are not officially associated with one gender, gender-specific characteristics still exist. My work method will involve a data analysis of advertisements that are specifically targeted at men and women within domains that continue to show clear gender distinctions, such as fashion. I will identify patterns and characteristics within these advertisements and investigate whether these patterns are also present in domains that are now shared by both genders, such as parenthood and finance. This approach will help to uncover if traditional gender marketing strategies are still prevalent in areas commonly considered gender-neutral.

github.com/ravitamoss/ads

Related Work

A study that examined the stereotypical presentation of genders in advertisements primarily focused on the visual representation and found significant differences—men are usually stereotyped as talented, as-

sertive, independent, and achievement-oriented, while women are generally stereotyped as warm, social, interdependent, and relationship-oriented [1]. Women are often portrayed as younger and more concerned with physical attractiveness than their male counterparts. Focusing on television advertisements, it was found that although the portrayal of women in mass media seems more positive than in the past, gender stereotypes and inequality through mass media are still a prominent phenomenon, including women being shown as receiving approval from family and men, whereas men receive social and career advancement. Another research examined the effects of visual design in online advertising, concluding that the visual design of internet ads influences consumer purchases, particularly among men [2]. This indicates that visual elements such as colors, fonts, and graphics directly improve advertising and brand attitudes, especially among men, leading to increased online purchase intentions through these attitudinal effects.

Data Collection

Print advertisements were collected from the Pinterest website - a visual discovery engine for finding ideas and inspiration. Pinterest is particularly popular among younger audiences, and it is very important in light of the question I'm trying to answer in this research. The data were collected in two stages: First, Gender labeled Database, which includes Ads tagged with their target audience - men or women, in advertising domains where it's clear there are different characteristics between ads aimed at different genders, given the fact that the marketed product itself differs between men and women. I chose to search for Ads in the fields of fashion, underwear, accessories, care, clothing, sports, and perfumes. It's clear that these fields belong to the same general field, and there might be overlaps, but this is not significantly important given the fact I am trying to identify differences between genders, not between fields. Second, the Natural unlabeled dataset included Ads from neutral fields, which seemingly could be associated with both genders. This dataset will serve to test the patterns I find in gender-targeted ads, to understand whether in social perception these fields are still associated with one gender only. The fields I chose to examine are financial, food, health, home decor, automobile, and baby products. Data Processing was conducted which considered the quality of the ads, duplicate ads - duplicates were deleted if they appeared in both men's and women's categories to prevent confusion during the data analysis stage, and images that were unclear whether they were ads or not. Images from fashion shows were removed, while images from catalogs or online shopping sites were retained(see Figure 1). Additionally, images of products alone were deleted, but images of products with an advertising aspect were retained (see Figure 2).

Figure 1. Fashion advertisement

Figure 2. Dior advertisement

After organizing and cleaning the data, the labeled database contained 3,080 advertisements, and the neutral database contained 618 advertisements.

Data Analysis

Colors

The first aspect that was examined was the colors characterizing the ads. Preliminary statistical reports that were printed, describing the colors in the image, showed darker images for ads targeting men. examination of average hues between genders and across different fields showed that in all areas except one, the hues in the images of men are darker. For women, the colors range from 130 and above, while for men, they range from 140 and below. The color analysis on the neutral dataset finds that in the areas of cars and

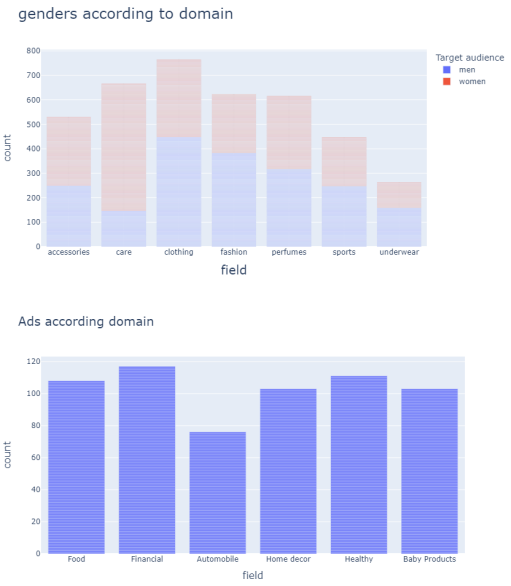

Figure 3. Final Data

finance, the colors are average and fall between the upper limit of men and the lower limit of women. In areas of parenting products, it is unequivocally seen that the ads are more similar to those of women. As for other areas, it seems that the ads are more targeted towards women. (see Figure 4)The findings correspond with the claim that women constitute more than half of the U.S. population and control or influence 85 percent of consumer expenditures[5].

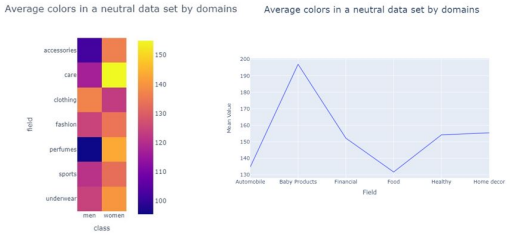

Figure 4. Color comparison

K means

Dividing the data into clusters using the K-means algorithm did not yield a clear result; it seems that the clusters included advertisements of all types, (see Figure 5). The rest of the clusters and divisions can be seen in the attached code file.

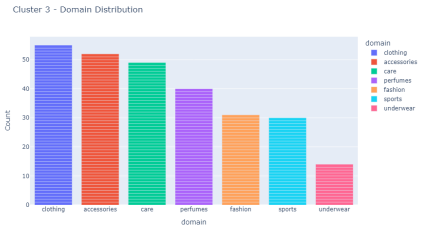

Figure 5. Cluster analysis example, field dividing

Classification

To perform supervised learning on the gender-based data, I first conducted a vectorization on the ads, flattening each image into a vector with 1k features that were added to the dataset for efficient classification. This vector can be thought of as a condensed representation of the image's content, encoding various visual features detected by the model.

Dimensional reduction

In dimensionality reduction for classification, it is observable that there is a slight separation between pairs of gender and field(see Figure 6).

Figure 6. Dimensional reduction visualization

Classifiers

Classification is the most crucial part for understanding our research question. After developing an efficient classification algorithm, which will be trained on the labeled dataset, it will be tested on the neutral set of ads to understand societal perceptions of genders.

After adding the vectors to the labeled dataset, the set was split into a training set and a test set, ensuring a similar number of classes and fields in each subset.

Several well-known machine learning classifiers were evaluated: Random Forest, Logistic Regression, Support Vector Machine, K-Nearest Neighbors, Naive Bayes, Decision Tree, XGBoost, and Neural Network.

The classifier that provided the best results in terms of accuracy was the SVM, achieving a correct classification rate of 80 percent (see Figure 7).

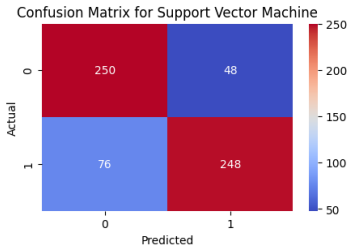

Figure 7. SVM Confusion Matrix

The neutral dataset, which does not contain gender classifications and includes advertisements targeted at both genders, was vectorized in exactly the same manner as the labeled dataset.

The SVM classifier, trained on the labeled data, was applied to the neutral dataset. In the fields of finance and automobiles, the classifier predominantly identified most images as targeted towards men. In the areas of parenting (baby products), food, and health, the majority of images were classified as targeted toward women, while in the field of home decor, the classifications were similar for both genders(see Figure 8).

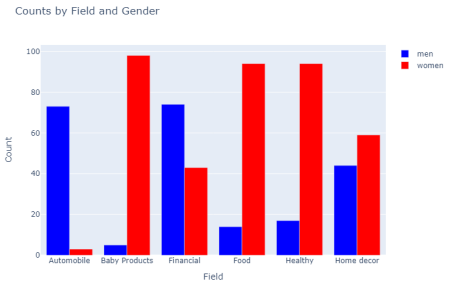

Figure 8. Natural Ads Classification

An example of some classifications can be seen in Figure 9.

Person and Face Detection

In this section, the study aimed to understand the perception of using persons in advertisements. Both datasets of advertisements were processed using an object detection algorithm to identify images that contain people. This analysis tested the claim made by Kniazian, Anna (2014)[1], which suggests that

Figure 9. Natural Ads Classification - the automobile and food ads were classified as targeting men, and the home decor ad was classified as targeting women

women are generally stereotyped as warm, social, interdependent, and relationship-oriented. It was found that advertisements targeting women more frequently used person models in their ads, and these ads also tended to feature more than one person more often than those targeting men(See Figure 10).

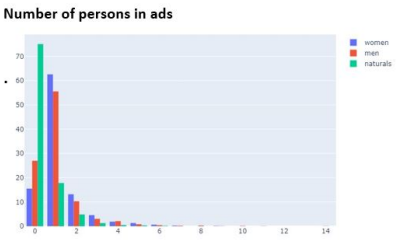

Figure 10. Number of Persons in Ads

A facial recognition algorithm was applied on images in which persons were identified. Subsequently, an emotion recognition model was used on these images to determine whether advertisers associate emotions with gender (See Figure 11). The emotion recognition model I used classifies five emotions: anger, fear, happiness, neutral, sad, and surprise. For each of these emotions, the model returns the probability that the emotion appears on the identified faces. I considered an emotion to be truly detected in the image only if the probability was higher than 50 percent.

Among all the images in which faces were identified, it appears that the dominant emotion for both genders combined is neutral (See Figure 12). Looking at several advertisements where the emotion was classified as neutral, it seems that the model identifies a penetrating, sensual, or sexy look as neutral (See Figure 13). This may provide insights into the advertising approach itself and how advertisers generally engage with people, but it does not highlight a dominant difference between the genders.

Figure 11. person and face detection - emotion detected: anger.

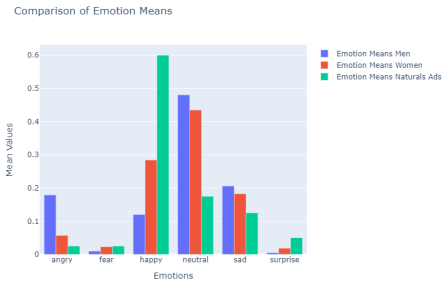

Figure 12. Emotion per target audience

Regarding the other emotions identified in the images, it appears that advertisements targeting women often show significantly more happiness or sadness, while those targeting men more frequently display anger.

CONCLUSION

The color patterns analyzed in ads aimed at women and men show that, even today when women are not just housewives whose roles are to maintain the home and raise children but also earners and professionals, parenting ads are clearly targeted at women.

Classifiers trained on ads for women and men, by vectorizing and extracting features from the images, clearly identified patterns in these ads. Analysis of the neutral dataset showed that ads about parenting, home design, health, and food are aimed at women—areas linked to home care and family routines. In contrast, finance ads are mostly aimed at men, relating to economic control, professional careers, and supporting the family.

The study of emotions in ads helped understand the messages aimed at different genders. Ads for women often show women expressing happiness or sadness,

Figure 13. Emotion detected as neutral

fitting old stereotypes that women should be pleasing and sometimes showing weakness. However, the most common emotion in men's ads is anger, linked to dominance and control.

This analysis also shows clear differences between ads for men and those for women, not only in obvious areas like underwear and fashion but also in general areas like parenting, home care, and automobiles.

Women have made significant strides in recent decades. They make up about 25

In light of these developments, it is appropriate for the advertising world to adapt to the modern era. Nowadays, where education depends on exposing the younger generation to various media platforms shaped by all the content they encounter, which largely includes advertisements, it is crucial to stop old stigmas and convey newer, more modern messages.

The studies reviewed in preparation for this work mainly focused on the differences in the characteristics of advertisements for the two genders but did not examine the patterns in general fields. This research provides a deeper understanding of the social perception advertisers have of men and women.

Recommendations for Further Research

In preparation for this study, two datasets were prepared. The first set, a collection of images from the Pinterest website, was gathered from the internet for data analysis via image processing. Due to a lack of sources or quality and free archives for advertisements, an additional set of ads was created using Google's generative adversarial model, Gemini. This model produced a set of written advertisements (attached to this work), which includes features such as target audience, tone, level of aggressiveness, product name, content world, ad text, and a description of a suitable image.

The rationale behind building using the chat is that it is trained on vast amounts of information from the internet and can create advertisements very similar to real ones – from which conclusions can be drawn about reality.

The second dataset ultimately was not used for data analysis in this research but can be utilized for further research and data analysis by language models.

ACKNOWLEDGMENTS

In the preparation of this work, I assisted Chat-GPT (GPT-4) [3] to partially write and debug code. Also, Gemini 1.5 [4] was used to generate a textual advertisements data set.

References

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