COSMETICS – A BOON OR A BANE

Embedded Project

Submitted

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I. INTRODUCTION

According to the Federal Food, Drug & Cosmetic Act (FDA) cosmetics, or makeup, is defined as "articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body for cleansing, beautifying, promoting attractiveness, or altering appearance" (Edmonds, 2011). Cosmetics plays an important role in self-perceptions and perceptions of others as well, which influences social reactions. According to Robertson and colleagues (2014), there is a positive correlation between frequent cosmetic usage and anxiety, self-consciousness, introversion, and conformity. Cosmetic usage is also negatively correlated with extraversion, social confidence, emotional stability, and intellect. So not only does makeup use relate to confidence and other internal characteristics, but it is also related to one's social interactions as well. Miller and Cox (1982) uncovered that women who were concerned about their appearance wore more makeup and were more apt to believe that makeup enhanced their social interactions. This same study found that self-reported makeup use and public self-consciousness were significantly related. We are aiming at finding the extent of these perceived values as a part of this project.

Another important aspect that has come to light in the recent years is the impact the use of these products has upon the environment. The effects vary in degree. Packaging which takes hundreds of years to break down, toxic chemicals that get washed into rivers and oceans, livestock poisoned by the flow of effluents from factories, deforestation in the name of extracting essential oils are just some of the known environmental impacts of this ever-booming industry. Many important questions arise when these factors are discussed. Are the consumers aware of the toll these products are taking on the environment? If yes, do they care enough to use environment-friendly products? If no, what can be done to change them into informed consumers? Is consumerism sustainable at this rate? To get a better understanding of these questions, we need to conduct surveys and analyze the data collected.

II. PROBLEM STATEMENT

The main aim of the project is to analyze the consumer's perceived values on cosmetics and their psychological and environmental impacts. The effects it has on a human's psyche is to be studied with the help of an accompanying questionnaire, which will help in the process of understanding and quantifying the former. We would also be using an additional questionnaire to elicit how informed the consumers are on the environmental impacts of the very products that they use.

III. OBJECTIVES

The objective of this project is to:

- Analyze and quantify the perceived value of cosmetics and its correlation to their usage.
- Analyze how informed the consumers are of the environmental impacts associated with the products they use.
- Formulate a Social Marketing Campaign to decouple self confidence and the usage of cosmetics, while also educating the public about the drastic environmental effects and promoting usage of eco-friendly cosmetics

The former objectives will be realized with the help of questionnaires, exploratory data analysis, statistical analysis and the latter by drawing inferences from the analysis made to formulate a successful campaign.

IV. SOCIAL MARKETING CAMPAIGN PLAN

A. *Target Group and Objective:*

We have not randomly decided our target group, nor did we make logical assumptions while deciding our target group. We performed multivariate analysis on the use of cosmetics and its perceived value using the data collected from a survey, which we will elaborate in a later section. The target group selected after an in-depth understanding of the data collected, the correlation between the use of cosmetics and self-esteem does not depend on gender, on the other hand, we found a significant relationship between the use of cosmetics and self-esteem is highly dependent on age. Our study gives us necessary information for us to choose young adults (Both men and women), as our target group due to their extensive use of cosmetics and their false belief that using cosmetics goes hand in with Confidence, beauty, respect, etc.

Therefore, our target group is every young adult who uses cosmetics in their day to day routine, and our objective is to find out the positive and negative impacts of cosmetics on human health (Physical as well as mental), Environment. We will analyze the relationship between the use of cosmetics with anxiety, self-confidence level, and the state of being reserved. Hence, providing an alternate solution to the problem which we will discuss in the upcoming sections.

B. *Tools Used For Campaigning:*

Creating awareness among people is a big win for our team. To achieve this successfully, we are to going to need a few tools to strengthen our campaign.

Some of the suggestions for campaign tools are listed below:

1. Banners
2. Poster
3. Social Media - Instagram, Facebook, Twitter, etc.
4. YouTube
5. Blog
6. Awareness camps
7. Short films

C. *Campaign Plan:*

1.   In our campaign, we will target young adults both men and women who use cosmetics regularly, keeping in mind the fact that our target group most likely are educated enough to understand the harmful effects of the use of cosmetics, we will try to converse to the target group, peers, and also individuals to not only inform them about adverse effects of the cosmetic products which they might already know about and even try changing their fallacies about how cosmetics helps them improve their personality.

2.   We will organize an interactive public session in popular outings such as malls, parks, beaches, etc. to create awareness and to provide an alternative solution that will be explained in the next few points. We target the upper-middle-class and upper-class young adults as they are more prone to using cosmetics than the lower-class, and hence we choose public spots like malls, etc.

3.   We plan to use leaflets to gain public support for our campaign.

4.   We will design posters and pamphlets, which will explain the harmful effects of cosmetics on the environment, such as packaging elements that are used, results in plastic waste that contains chemical remains which are not degradable leading to land, waterbody contamination affecting terrain, aquatic wildlife, in an easily understandable manner, but also supports the use of organic cosmetics. The posters will also recommend people to use natural/organic cosmetics instead of chemical cosmetics if they find it challenging to overcome their false belief about cosmetics

5.   Promote the use of organics through advertisements, by recommending organic products we can reduce the risk of endangering the environment, the health of human being, as the use of cosmetics that aren't certified organic almost certainly contains chemicals linked to cancer, endocrine issues, weight gain, and even ADHD & autism moreover these components are harmful to the environment as they are not degradable

6.   We will create rallies in which we will distribute fruits, eggs to a few people who find it challenging to get from stores due to their economic condition through which we can create awareness among people of the fact the fruits, eggs, and many other food ingredients used to

manufacture cosmetics. In contrast, people who need those food items to keep them healthy fail to get their share.

7.   Set stickers and posters Auto rickshaws &Buses.

8.   Use Facebook, Instagram, Twitter, and other social media to giving update our target audience about our campaign continuously. The page content will be based on our daily activities and promotion of awareness on the effects of cosmetics.

9.   We will also create a Blog to express our opinion and create more awareness.

D. *Budget:*

Any social campaign or marketing campaign requires a budget or funds to successfully and efficiently implement the campaign. The budgeting is done in such a way that it even contributes to the various divisions of the campaign, i.e., Digital advertising, Workshops, Survey Implementation, Outreach programmers, etc. One of the main ways to get funds and financial support is crowdfunding. The concept of crowdfunding is the practice of funding a project or venture by raising small amounts of money from a large number of people, typically via the Internet. Crowdfunding is a form of crowdsourcing and alternative finance.

Why crowdfunding?

 The following are the points highlighted on why crowdfunding is more efficient than any other fundraising techniques:

1. The cost of sourcing funds through a crowdfunding platform/ site is usually negligible, and so is the effort.

2. A popular platform can easily reach out to a large group of potential donors who will contribute towards the educational fund.

 3. The website can be accessed by the parents or relatives or the NGO or institution itself to raise money for the child.

4. With the help of an influential campaign/ fundraiser, the funds can rise in a short period.

5. Digitalizing can further simplify the process

E. *Budget Split:*

The budget split among the various events and activities for increasing awareness: The central part of budgeting is how the separation will be among the multiple activities such as Content – Creation, Advertising, Employees & training.

Television	15%	TV Commercial Short Documentary
Printing Media	10%	Newspaper/magazine
Radio	5%	Short awareness Commercial
Events	10%	Seminar, rally
Social Media	5%	Facebook page, Twitter, YouTube, Blog
Outdoor Activities	30%	Poster, Banner, Leaflet, Billboard
NGO	10%	Volunteer activities, Charity
Brand Collaboration	5%	Educational Brands, School provision brands, etc.

V. RESEARCH METHODOLOGY

The study is initiated by a survey which asks people questions regarding their usage of cosmetics and the impact they have in their lives. This is carried out online. The demographics of the population is higher middle-class people with a varying age distribution. The answers to the survey questions are firstly converted into variables and stored into a dataset (a .csv file). If the answers to questions in the survey are ordinal values, the data is stored as numbers. If the answers are nominal, they are represented as alphabets.

The statistical research begins with a univariate analysis of the data obtained from the survey. This produces inferences regarding the distribution of a single variable independently. These are depicted and visualized with pie charts and bar graphs. This is done to understand the answering patterns within an individual variable. This is followed by a bivariate analysis conducted on SAS programing language.

A bivariate analysis is a statistical study of relationships between two variables. The hypothesis for the problem statement is that there is a relationship between the variables got from the survey and the perceived value of cosmetics. The aim of the analysis is to understand the correlation between the public perception of cosmetics used and other variables related to cosmetics, the target variable is an ordinal categorical variable or a numerical variable. Hence, Chi Squared Test and ANOVA-F tests are to be applied. A chi squared test is a statistical analysis test used to find whether a categorical/quantitative explanatory variable is related to categorical response variable. An ANOVA-F tests is used to find whether a categorical variable is related to a numerical response variable. A p-value of lesser than 0.05 indicates that the variables in comparison in the chi-squared test are correlated. We can hence validate or decline the null hypothesis by considering the p-value of the study.

# VI. ANALYSIS AND INTERPRETATION

A. *Univariate Analysis:*

The significant results of the univariate analysis are given below in charts.

Do you think cosmetics plays an important role in your life?

68 responses

- Yes
- No

61.8%

38.2%
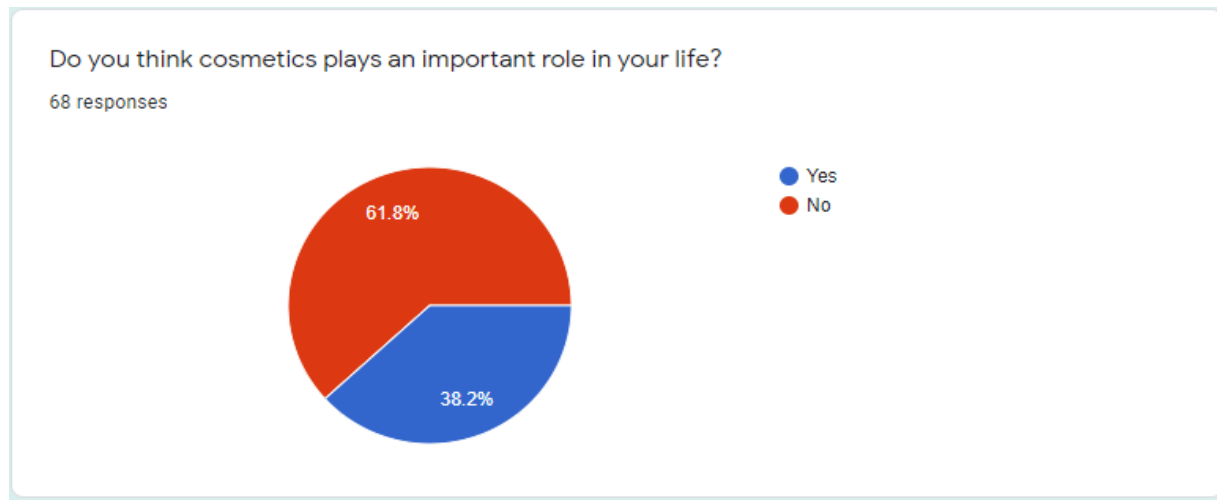
The question asks people whether they think cosmetics plays an important role in their life. More than half of the people haves answered yes. While analysing the responses of previous question, the people who voted no may be those who never use cosmetic products or only use them occasionally. The people who voted yes are the ones who accepted the fact that they use it frequently or even occasionally.

**What is the number of cosmetic items you use in one day?**

66 responses
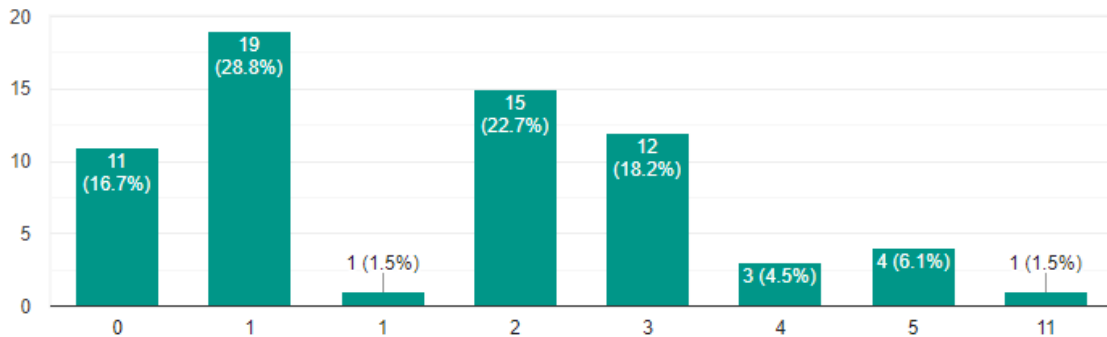
In this question, the statistics shows that 30.3% of the people use at least 1 cosmetic product in a day. 22.7% of them use 2 products in a day,18.2 of them uses 3. As the number increases, the percentage of people using them decreases. 16.7% of the people aren't daily users. This shows the significant number of people use only a few products in their lives on a daily basis.

Do you think cosmetics are harmful to your health?
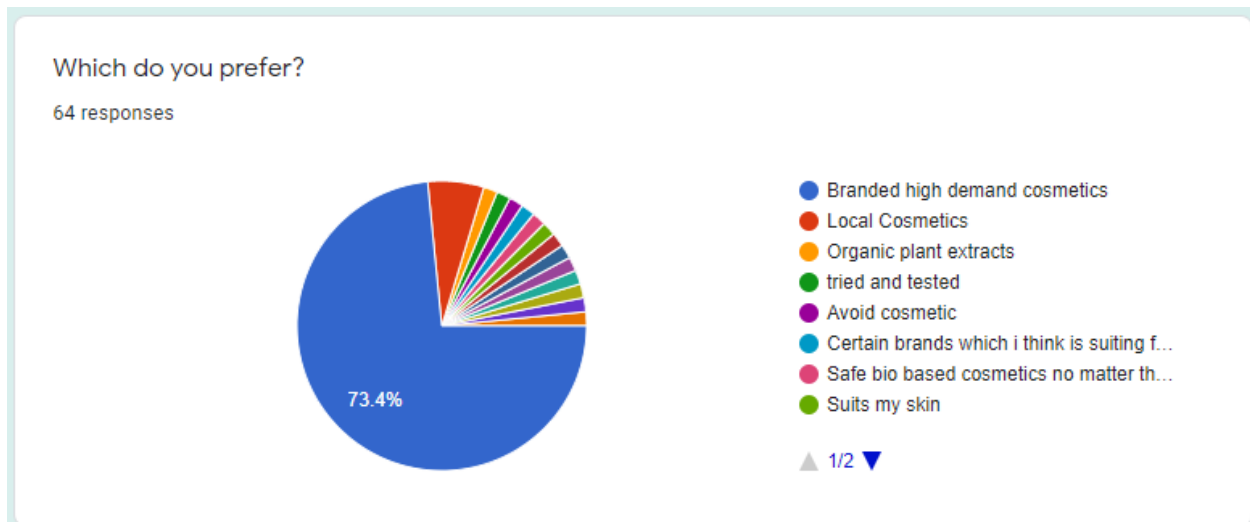
68 responses
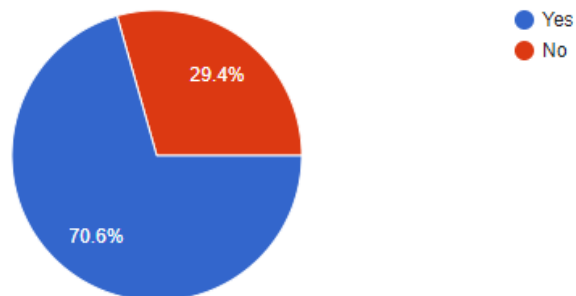
In this question 70.6% of the group voted for 'yes' and the rest that is 29.4% responded 'no'. The response for such a question mainly depends on their level of usage. People who use cosmetics often convince themselves that this is not going to be harmful for their health where the reality is

that they actually do.

Cosmetics have an impact on environment. Do you agree?

68 responses

- Yes
- No

16.2%

83.8%
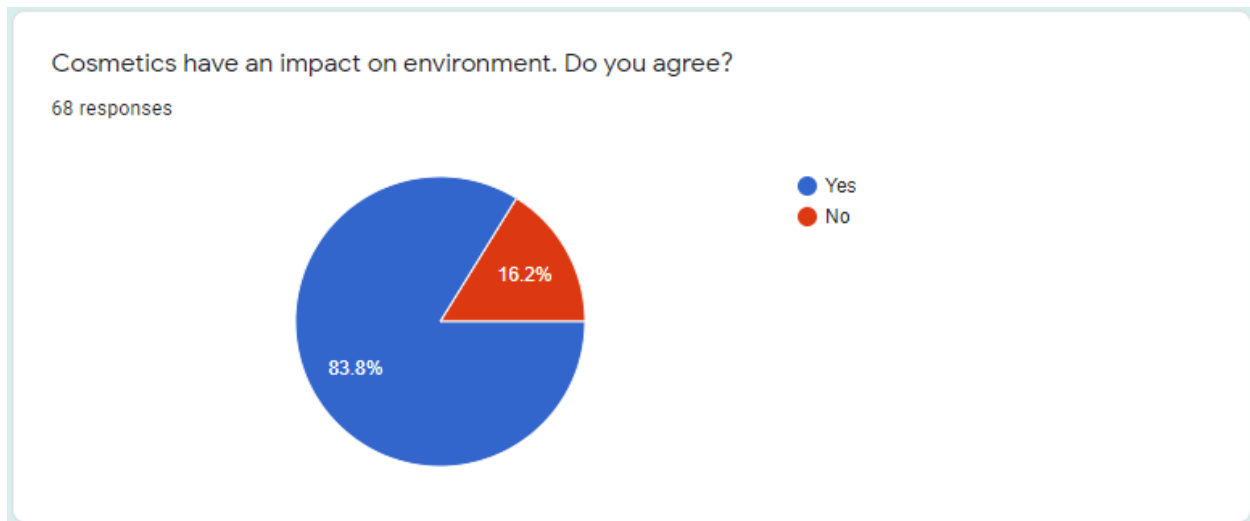
From this question, we can assume from the statistics that people believe products such as perfume, body spray etc. can pollute the air we breathe and can also contribute towards air pollution. Most of the products are made of chemicals. Disposal of these can be quite difficult as it might take years for decomposition to take place and it is inferred from this question that people are aware of this

Which do you prefer?

64 responses

- Branded high demand cosmetics
- Local Cosmetics
- Organic plant extracts
- tried and tested
- Avoid cosmetic
- Certain brands which i think is suiting f...
- Safe bio based cosmetics no matter th...
- Suits my skin

△ 1/2 ▼

73.4%

This question focuses on the type of cosmetics that people prefer to use. The pie chart clearly shows us that around 70 percent prefer to use high branded cosmetic products. A small

percentage also preferred local products over the others. From this, we can conclude that a large percent trust branded product.

It is clear from the above graphs that people are using cosmetics even after being aware of the environmental and health impacts it has. They are also self-conscious about themselves when it comes to wearing cosmetics. This forces them to use cosmetics even though they need to be avoided.

B. *Bivariate Analysis:*

a) **Gender and Cosmetics use**

The first bivariate analysis is conducted with a null hypothesis stating that gender and cosmetics use are statistically correlated to each other. Gender is a categorical variable denoted with name variable 'Male' which is encoded 0 for females and 1 for male entries in the survey. Usage of cosmetics are denoted by name variable 'cosmetics' and is encoded 1 for people who use cosmetics and 0 for those who do not.

Since both the independent and response variables are categorical, a Chi-squared test of Independence is conducted. The results of the test are shown below.

The FREQ Procedure

Frequency Percent Row Pct Col Pct	Table of Male by cosmetics		
		cosmetics	
Male	**0**	**1**	**Total**
0	6 5.61 10.34 24.00	52 48.60 89.66 63.41	58 54.21
1	19 17.76 38.78 76.00	30 28.04 61.22 36.59	49 45.79
Total	25 23.36	82 76.64	107 100.00

Statistics for Table of Male by cosmetics

| Statistic	DF	Value	Prob
Chi-Square	1	11.9903	0.0005
Likelihood Ratio Chi-Square	1	12.3208	0.0004
Continuity Adj. Chi-Square	1	10.4550	0.0012
Mantel-Haenszel Chi-Square	1	11.8782	0.0006
Phi Coefficient		-0.3348	
Contingency Coefficient		0.3174	
Cramer's V		-0.3348	

From the analysis, 36.78% of males do not use cosmetics and only 10.34% of females do not use cosmetics. The p-value obtained from the test is 0.0005. This value is lesser than 0.05. Hence, we can conclude that the null hypothesis is true. Hence,

Gender and cosmetic usage are statistically correlated

b) **Cosmetic usage and feeling insecure about oneself**

This bivariate analysis is between the 'cosmetics' categorical variable mentioned in the previous study and 'insecure' which is a quantitative variable. People in the survey are asked to rate how insecure they feel about their appearance and body odour on a scale of 1-5. This was represented by the 'insecure' variable.

Since the independent variable is categorical and the response variable is numerical, an ANOVA-F Test was performed. The results of the test are given below.
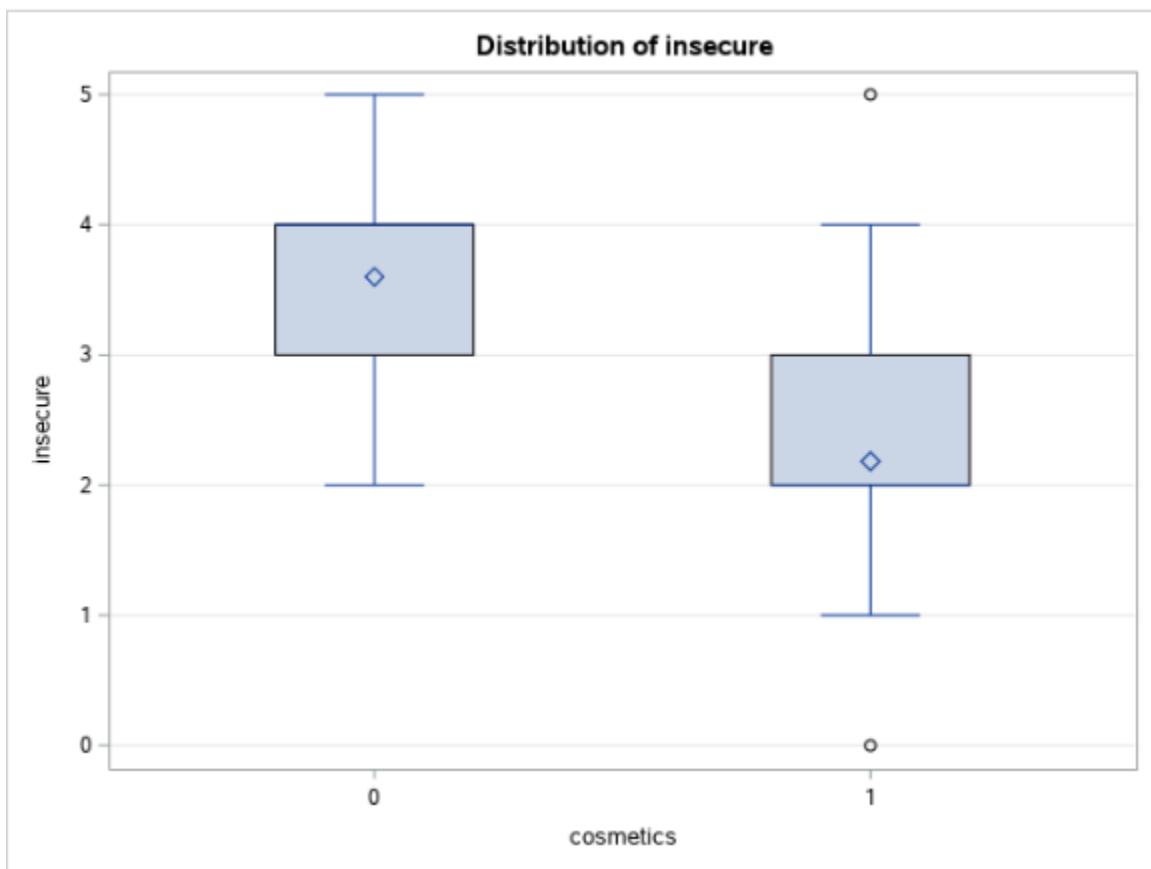
Given above is a box plot of the 'insecure' variable distribution across people who use cosmetics and people who do not use. The mean and standard deviation of insecurity across people who use and do not use cosmetics are given below:

Level of cosmetics	N	insecure	
		Mean	Std Dev
0	25	3.60000000	0.76376262
1	82	2.18292683	0.80320421

The mean insecurity value of people who use cosmetics is approximately 2.2 which is 64% lesser than people who do not use cosmetics.

The ANOVA Procedure

Dependent Variable: insecure

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	38.4728744	38.4728744	60.97	<.0001
Error	105	66.2560976	0.6310105		
Corrected Total	106	104.7289720			

R-Square	Coeff Var	Root MSE	insecure Mean
0.367357	31.59729	0.794362	2.514019

Source	DF	Anova SS	Mean Square	F Value	Pr > F
cosmetics	1	38.47287440	38.47287440	60.97	<.0001

From the ANOVA-F test, the p-value is found to be <0.0001. This value is lesser than 0.05. Hence, we can conclude that the null hypothesis stating that cosmetic usage and insecurity levels are related is accepted. Therefore,

Cosmetic usage and insecurity levels are statistically correlated

c) Gender and Brand Loyalty

The next bivariate analysis is between gender and Brand Loyalty. In the survey, people were asked to rate on a scale of 1-5 on how loyal they were to the brand of cosmetics they use. This was denoted by the name variable 'loyal'.

Since the independent variable, 'male' is categorical and the response variable 'loyal' is quantitative, an ANOVA-F test is used.
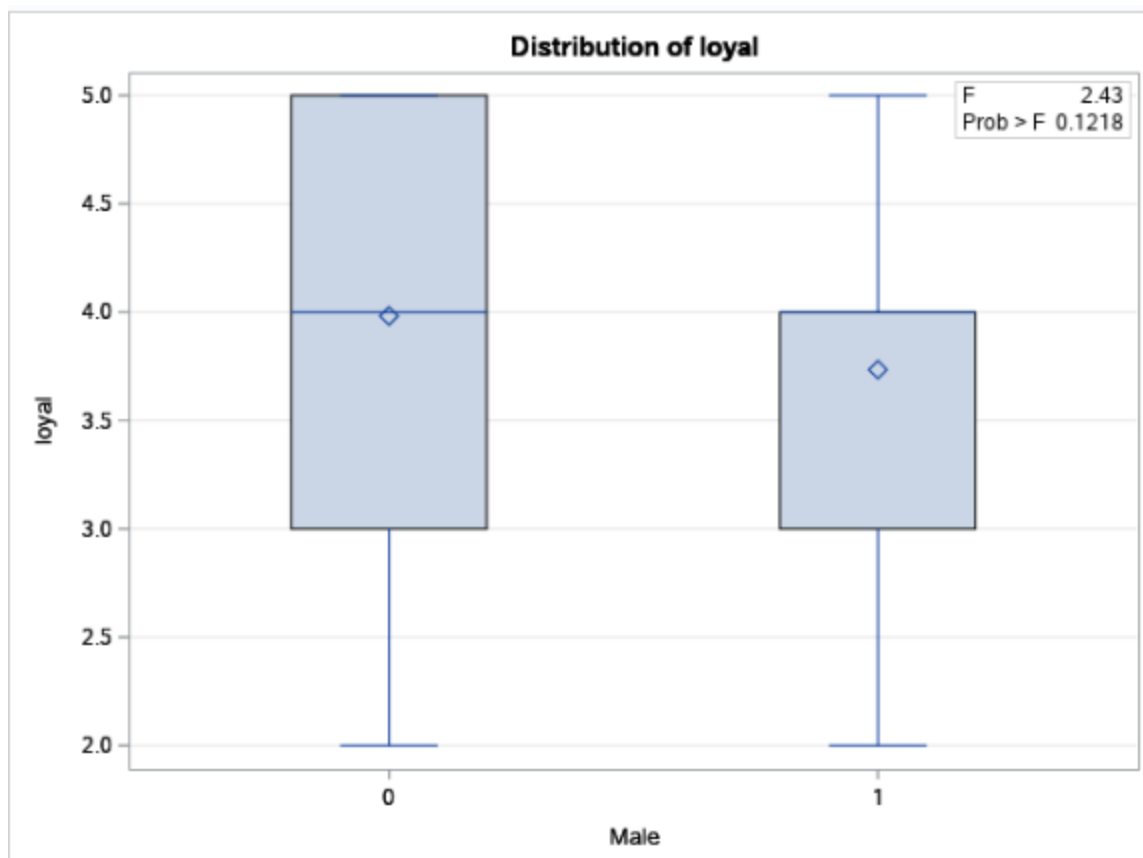
The box plot for brand loyalty in both the genders are given above. The mean and standard deviations of both the 'loyal' variable are:

Level of Male		loyal	
	N	Mean	Std Dev
0	58	3.98275862	0.82698733
1	49	3.73469388	0.81074837

The ANOVA Procedure

Dependent Variable: loyal

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.63444527	1.63444527	2.43	0.1218
Error	105	70.53377903	0.67175028		
Corrected Total	106	72.16822430			

R-Square	Coeff Var	Root MSE	loyal Mean
0.022648	21.18299	0.819604	3.869159

| Source	DF	Anova SS	Mean Square	F Value	Pr > F
Male	1	1.63444527	1.63444527	2.43	0.1218

From the ANOVA-F Test, the p value for the analysis was found to be 0.1218. This value is greater than 0.05. Hence, the null hypothesis can be rejected. Therefore, males and females are equally brand loyal.

Gender and Brand Loyalty are not statistically correlated

d) <u>Age and Dependence on cosmetics:</u>

In this bivariate analysis, we compare people age with how dependent they are on cosmetics for appearance. For this purpose, the ages of people are binned into three groups. People with ages between 18-24, 25-40 and 40-65 are binned into labels 1,2 and 3 respectively and are represented with a name variable called 'agebin'. People are asked to rate how dependent they are on cosmetics on a scale of 1-5 and this is denoted by the variable 'dependency'.

Since 'agebin', which is the independent variable is categorical and 'dependency' which is the response variable is quantitative, an ANOVA-F Test is conducted. Also, since there are more than two age categories, a Duncan Post Hoc Test is conducted to test for dependencies between the groups.
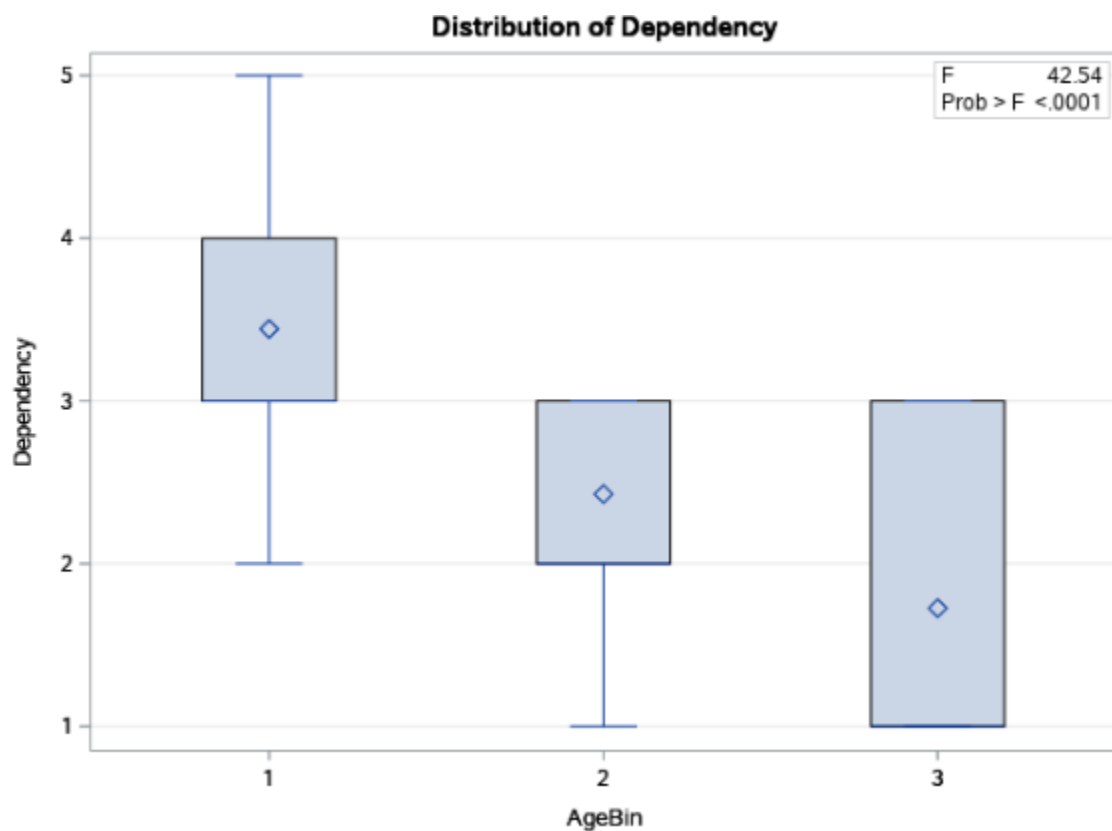
Given above is the box plot for the three categories of 'agebin' and the distribution of 'dependencies' for the same. Clearly, 'dependencies' seem to decrease with age.

The ANOVA Procedure

Dependent Variable: Dependency

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	40.73962899	20.36981450	42.54	<.0001
Error	104	49.80242708	0.47886949		
Corrected Total	106	90.54205607			

R-Square	Coeff Var	Root MSE	Dependency Mean
0.449953	23.58103	0.692004	2.934579

Source	DF	Anova SS	Mean Square	F Value	Pr > F
AgeBin	2	40.73962899	20.36981450	42.54	<.0001

The p-value produced from the ANOVA-F test is <0.0001. This is lesser than 0.05. This denotes that there is a statistical relationship between the 'agebin' variable and 'dependency'. Hence, we can accept the null hypothesis that age and dependency of cosmetics are correlated.

The Duncan test results are shown below:

Dependency Duncan Grouping for Means of
AgeBin (Alpha = 0.05)
Means covered by the same bar are not significantly different.

AgeBin	Estimate
1	3.4426
2	2.4286
3	1.7273
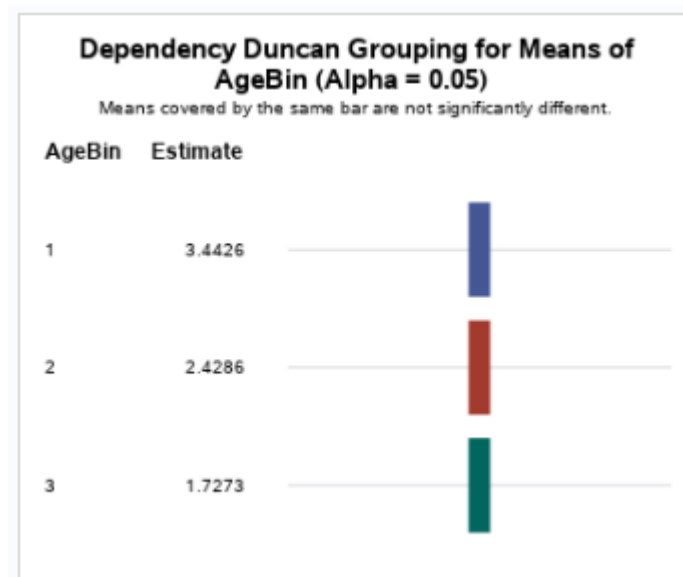
The differing colours between the three groups denote that all three group's values for Dependencies are statistically different to each other. Therefore,

Age and dependency towards cosmetics are statistically correlated

VII. DISCUSSION

A. *SOCIAL IMPACT OF COSMETICS*

Will you be confident to attend a professional meeting without makeup or perfume? Do you judge people with a no make-up look? The analysis conducted by this study has proven that people are less self-conscious about themselves when they use cosmetics. It has also revealed that even though females tend to use more cosmetics than men, both the genders are brand loyalists when it comes to cosmetics.

Collecting raw materials for any product can be quite a task. The ingredients that brighten up your skin, remove blemishes and wrinkles are quite hard to formulate. People pay for these products with a certain intention. And if this is not met, then the product will not have value. Chemically made products can have side effects on certain people based on their skin condition. Therefore, these days people incline towards naturally obtained products. This is one of the reasons that cosmetics have a negative impact on the society. Most of the cosmetic industries tend to obtain natural products through illegal ways i.e., from human or animal tissues etc. Apart from this, many also tend to use endangered flora for the same. This does not go along with the concept of sustainability and is one of the most important factors that needs to be taken care of.

Other products like perfumes and Deodorants can have a negative impact on people who have breathing problems. Skin products such as foundation, lipstick can also trigger cancer cells if a person is prone to it. Nowadays cosmetic plastic surgery is a common practice for not only models or actors but also for common people like us. The number of pills that you intake after the surgery can also have a negative impact on your body in different ways. The other side of the

coin indeed shows us the positive impact cosmetics have on people. The confidence cosmetic product provides in a person is a factor to be considered. The feeling one gets when they stand in front of an audience with a clean, fresh face and a beautiful smell is something different. Studies have shown that this has helped boost careers of millions of people worldwide. The belief one will have with make-up and perfume is more than one without anything. One also feels insecure and low. This will not only affect one's job but will also have a negative impact on your mental health. This is what makes eradicating cosmetics immediately from the society impossible. Hence, the need for the hour is to make the public use more biodegradable cosmetic products. These are sustainable options which are not harmful to the environment.

B. *ENVIRONMENTAL IMPACTS OF COSMETICS:*

As consumers, we are becoming increasingly aware of the health dangers posed by cosmetics and personal care products, but the environmental impacts of these products are less well documented. While 90% of us recycle kitchen waste, 50% of us don't recycle bathroom waste such as shampoo, conditioner and shower gel bottles simply because it's inconvenient. This means 2.7 billion plastic bottles hit landfill every year. 120 billion units of packaging are produced every year by the global cosmetics industry. The cardboard that envelops perfumes, serums and moisturizers contributes to the loss of 18 million acres of forest each year. If this level of consumption continues, by 2050 there will be 12 billion tonnes of plastic in landfills, the equivalent to 35,000 Empire State Buildings. The UN has declared our current situation a 'planetary crisis' and no industry is exempt from scrutiny, including beauty.

Surprisingly, about 83.8% of the responses in our dataset are aware of the impact that these cosmetics have on the environment. This suggests that people are definitely informed to some level of issues mentioned beforehand. They might not know the extent of the impact, but they certainly do realize that there is a negative effect.

This notion is again reinforced by the responses to our next question. When asked to choose between different types of cosmetics, 73.4% of the demographic chose "Branded High demand Cosmetics". This goes on to show that the knowledge that they have on the environmental impacts of these brands are minimal at the most. These big brands usually market themselves as natural products, but contribute significantly to pollutions.

'Natural' is in and beauty brands are cashing in on it, but are their products what they seem? In reality, many beauty brands are adding a few natural ingredients to their products, but still using the same chemicals and toxic ingredients as well. The natural beauty trend has also increased demand on natural ingredients. The challenge with this is that when large companies source these natural ingredients, they are looking to do so as quickly and as cheaply as possible, leading to unsustainable production. When produced mindlessly, the use of natural ingredients in cosmetics on a large scale, such as mining of minerals and of petroleum-based products, disrupts ecosystems and depletes non-renewable natural resources.

There are also the non- natural ingredients to consider. Most large beauty brands are using chemical components in their products, whether they claim to be natural or not. This is because chemicals give the products their long shelf life and allow for the various textures and feels you find in traditional cosmetics. The challenge with these chemical components is that they don't break down and instead accumulate in our ecosystems. Traditional cosmetics and toiletries do the most damage to the environment once they are washed away down our sinks. From our sinks the chemicals are released into our lakes, streams, rivers and public water systems, damaging wildlife and flora and fauna.

It is not just aquatic life that is impacted. Water from our lakes and seas vaporizes in our atmosphere and accumulates in clouds, returning to our soil as rain. Chemicals related to cosmetics have been found in agricultural soil and household dust particles.

It is also important to consider the packaging element of the cosmetics we buy. Concerns about plastic waste and marine pollution have skyrocketed, especially after China announced its ban on imports of foreign waste from January 2018. The bottles that hold shampoos, moisturizers and other skincare products must be created in a way that means they are not degraded by the products that they have been designed to hold. This means that they are also not easily degradable or recyclable after use, leading to the plastic we hear about that pollutes our seas and causing harm to wildlife.

Hence, a campaign pushing towards keeping the consumer well informed about these effects would be the best course of action. It won't just enlighten the consumer, but would also show the industry that people are wanting the change.

VIII.   CONCLUSION

We had taken up the project with two main objectives in mind, to understand and quantify the values related to cosmetics which are perceived by the people, and to see how well informed these individuals are about the drastic effects these products have on the environment.

The statistical study of the responses indicated that there exists strong correlation between gender and cosmetic usage, with females having more usage than males. It was also determined that cosmetic usage and insecurity levels are statistically correlated. People who don't use cosmetics seem to be much more insecure than the ones who do. This shows that people have started associating cosmetics with being more confident. By trying to show the public that they are two separate things and that one need not use these products to feel confident, we will end up increasing the self-confidence of our particular target group (young adults who are reliant on cosmetics to feel confident).

Another one of our study has shown that most people know the negative impact these products have on nature, but still tend to use the popular ones. Targeting this group and educating them about the almost-irreversible damage that they are causing to the environment is a potential plan of action.

Completely phasing out the use of cosmetics might be a goal which is unrealistic, but would help achieve both our objectives (of decreasing the dependency people have on cosmetics, while at the same time preventing further damage to nature). A better alternative would be the aforementioned plan of action. Campaigning for the use of eco-friendly materials in cosmetics, using real natural alternatives for cosmetics and pushing forward local sustainable cosmetic products would greatly benefit the second objective.

Short films bringing into light the long term negative psychological impacts of using these products can be made. A social media campaign asking people to show their true self would greatly push the tide against the unnatural use of cosmetics. It might provide the little push that many people need to realize the consequences. A successful campaign built around these foundations would greatly benefit the society and environment.