

# Discriminant Analysis on Factors That Determine the Type of Women Hairstyles

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**Abstract**--- This research work uses discriminant analysis to classify women hairstyle (modern weaving, traditional weaving and fixing) according to their face type, complexion, age and price of the hairstyle. Data for the research work is primary, collected by interviewing 25 women in Esa-Oke, Osun State and from sampled major hair stylist. Findings revealed that price of hairstyle is the most important variable that determines the type of hairstyle selected by women, followed by age, followed by complexion while face type is the least important factor that determines the type of hairstyle selected by women.

**Keywords:** *Hairstyle, Discriminant Analysis, Women, Oblong, Weaving, Fixing.*

## I. INTRODUCTION

Hair has played an important and varied role in the life of people since early times. Hairstyle became an inseparable element of fashion. Its form changed depending on the taste of the period, tradition and on geographical and social conditions. From early times, people endeavoured to emphasize their exceptionality and position by means of unusual or impressive hairstyles. As mentioned above, Roman coins provide an extraordinary gallery of hairstyle fashions.

The way of arranging the hair on female coin portraits from the period of the Roman Empire also very much helps with identifying and dating individual coins. Similarly, we can chronologically determine the type of hairstyle by comparison with pictorial or sculptured portraits of women. Coin portraits of empresses on coins show remarkable craft skill and artistic creativity. They accurately reflect the style of their time and the appearance of the individual ladies. They owe their extraordinary appearance to skilful hairdressers. Their art is proved by

the artistic hairstyles of the women from the simplest to the complex, which their coin portraits show us.

In Nigeria, hair styling is an art form that begins from birth. Nigerian hair styles use principles of art and design, including curves, zigzags, horizontals, perpendiculars and straight lines (Oladumiye, Adiji, and Olabiyi 2013). Traditionally, hair styling has been a highly respected vocation, and people who showed special talents for hair dressing were urged to pursue it as a career.

A common historical and environmental influence results in some similarities among Nigerian hair styles, but there is great diversity in designs and types of styles for different social occasions. Ceremonies and festivals, in particular, are characterized by specific designs, with every clan and tribe representing their cultural hair styles. Similarly, idol worshippers design their hair styles in connection to gods. These two examples express ancestral beliefs and religious faith in unique ways that result in a great, meaningful variation on art and design forms.

Discriminant analysis is a technique for predicting and classifying a set of observations into predefined classes. It is used to determine which continuous variables best discriminate between two or more natural occurring groups. The model is built based on a set of observations for which the classes are known and this discriminant function is used to predict the class of a new observation with unknown class.

Discriminant Analysis may be used either to assess the adequacy of classification, given the group memberships of the objects under study or to assign objects to one of a number of (known) groups of objects. It thus has a descriptive or a predictive objective. It is one of the available techniques for developing a rule or model to enable one identify or discriminate between cases based on

the rule or the underlying principle. This technique is used for analyzing data when response variables are categorical and the predictor variables are interval scaled (Tabachnick & Fidell, 2011).

Most researchers on analytical modelling usually examine the relationship that exists between/among one dependent quantitative variable and other independent quantitative variables. There are scarce research works on the combination of quantitative and qualitative variables. This research work therefore aimed at bridging this gap by examining the factors that determine the type of hairstyle selected by women, using discriminant analysis. The main objectives of this study are to:

1. identify the variables that best discriminate between types of hairstyle chosen by women. (i.e. to determine most influential factors that trigger the various choices).
2. use the identified variables or factors to develop a good classification function that is a linear combination of the predictor variables and would be reliable in classification cases.
3. undertake discriminant classification analysis which classifies cases (sampled women) into groups and also to assign new objects to one of a number of known groups thereby validating the predictive function.
4. test theory by observing whether cases are classified as predicted.
5. assess the relative importance of the independent variables in classifying the subjects based on their preferred choices of hairstyles.
6. examine whether significant differences exist among groups (types of hairstyle).
7. determine the percentage of variance in the dependent variable explained by the independents over and above the variance accounted for by control variables. (Garson, 2012).

## II. MATERIALS AND METHODS

### A. Data Description

This research work covered twenty-five selected women in Esa-Oke, Osun State. The primary source of data was used for this research. Women selected in the study area (Esa-Oke) were interviewed to know their preferred hairstyle, face type, age and complexion and the average price of the different hairstyle.

### B. Methodology

The variables are represented and coded for SPSS analysis thus:

$X_1$  = Face type (oblong = 1, oval = 2, round = 3, square = 4)

$X_2$  = Complexion (chocolate = 1, dark = 2, light = 3)

$X_3$  = Age (years)

$X_4$  = Average Prices of hairstyle (Naira)

$Y$  = preferred hairstyle (traditional weaving = 1, modern weaving = 2, fixing = 3)

After coding and data entry, the discriminant analysis was run on the data using the SPSS Version 17.

## III. ANALYSIS

The analysis was carried out by using SPSS Version 17. After the data was coded accordingly in SPSS, we clicked on Analyze > Classify > Discriminant. The preferred hairstyle is specified as the grouping variable while the independent variables are face type, complexion, age and price. Click on means, univariate ANOVAs and Box M's under Descriptive Statistics and click on Fisher's and Unstandardized under Function Coefficients. Then click on OK button to run the analysis.

## IV. RESULTS

**Table 1: Group Statistics**

Preferred Hairstyle		Mean	Std. Dev.
<b>Traditional Weaving</b>	face type	2.00	.000
	Complexion	1.75	.957
	Age	19.75	3.304
	Price in Naira	700.00	244.949
<b>Modern Weaving</b>	face type	2.35	.862
	Complexion	1.88	.600
	Age	22.00	2.669
	Price in Naira	1623.53	733.595
<b>Fixing</b>	face type	2.75	.957
	Complexion	2.50	.577
	Age	24.00	4.546
	Price in Naira	1125.00	946.485

**Table 2: Tests of Equality of Group Means**

	Wilks' Lambda	F	df1	df2	Sig.
face type	.928	.848	2	22	.442
Complexion	.868	1.671	2	22	.211
Age	.852	1.908	2	22	.172
Price in Naira	.787	2.982	2	22	.071

**Table 3: Summary of Canonical Discriminant Functions**

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.586 <sup>a</sup>	63.8	63.8	.608
2	.333 <sup>a</sup>	36.2	100.0	.500

a. First 2 canonical discriminant functions were used in the analysis.

**Table 4: Unstandardized Canonical Coefficients**

	Function	
	1	2
face type	.615	.228
Complexion	.716	-.376
Age	.838	.053
Price in Naira	-.116	1.009

**Table 5: Classification Function Coefficients**

	preferred hairstyle		
	traditional weaving	modern weaving	fixing
face type	6.202	7.239	8.188
Complexion	7.240	7.418	9.670
Age	2.841	3.102	3.520
price IN Naira	.000	.001	.000
(Constant)	-41.396	-51.453	-66.342

The discriminant functions that represent the data in this study are:

$$D_1 = 0.615 \text{ face type} + 0.716 \text{ complexion} + 0.838 \text{ age} - 0.116 \text{ price}$$

$$D_2 = 0.228 \text{ face type} - 0.376 \text{ complexion} + 0.053 \text{ age} + 1.009 \text{ price}$$

**For traditional weaving**, the function is

$$D_1 = 6.202 \text{ face type} + 7.240 \text{ complexion} + 2.841 \text{ age} + 0.000 \text{ price} - 41.396$$

**For modern weaving**, the function is

$$D_1 = 7.239 \text{ face type} + 7.418 \text{ complexion} + 3.102 \text{ age} + 0.001 \text{ price} - 51.453$$

**For fixing**, the function is

$$D_1 = 8.188 \text{ face type} + 9.670 \text{ complexion} + 3.520 \text{ age} + 0.000 \text{ price} - 66.342$$

## V. DISCUSSIONS

This research discussed the use of discriminant analysis in the determination of hairstyle selected by women in Esa-Oke based on some factors such as face type, age, price and complexion. The discriminant analysis technique is for separation and classification. The technique has a purpose of selecting the "best" (and as few as possible) set of variables for developing a model that can be used to separate groups and also classify new cases.

A discriminant analysis was conducted to predict whether a woman will select modern weaving, traditional weaving or fixing as her preferred hairstyle. Predictor variables were age, price, complexion and face type. The analysis showed that there are no significant mean differences among independent variables.

The discriminant functions revealed significant association between groups and all predictors. Function 1 accounted for 60.8% of between group variability, while Function 2 accounted for 50% of between group variability. The cross validated classification showed that overall 68% of the original grouped cases were correctly classified'..

## VI. CONCLUSION

Based on the analysis above, this study concluded that price of hairstyle (0.787) is the most important variable that determines the type of hairstyle selected by women, followed by age (0.852), followed by complexion (0.868) while face type (0.928) is the least important factor that determines the type of hairstyle selected by women.

Also, there is strong statistical evidence that there is no significant difference among the means of traditional weaving, modern weaving and fixing. Meanwhile, some major problems associated with discriminant analysis are that it requires that the distribution regarding the

independent variables is normal. A reliable or good model should be able to come up with high correct classification with less or few misclassifications.

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