Week 3
Assignment 3

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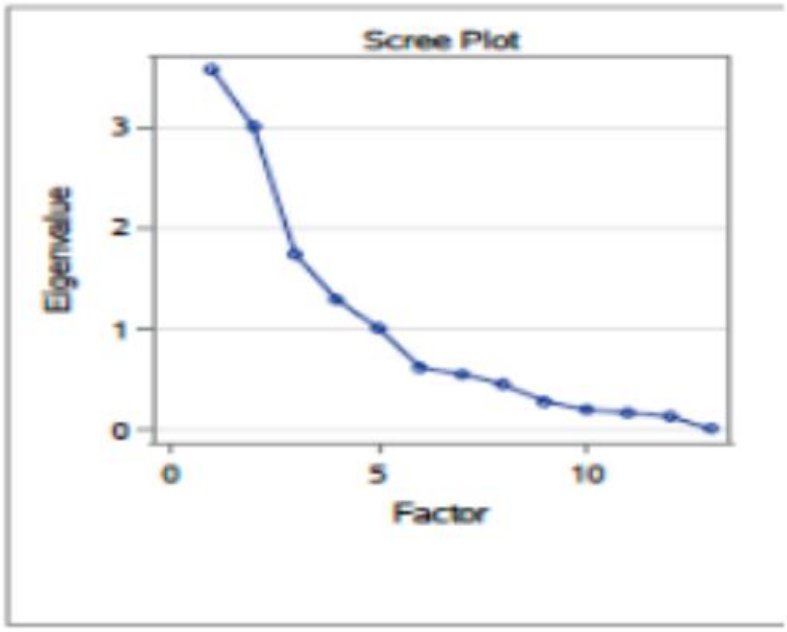
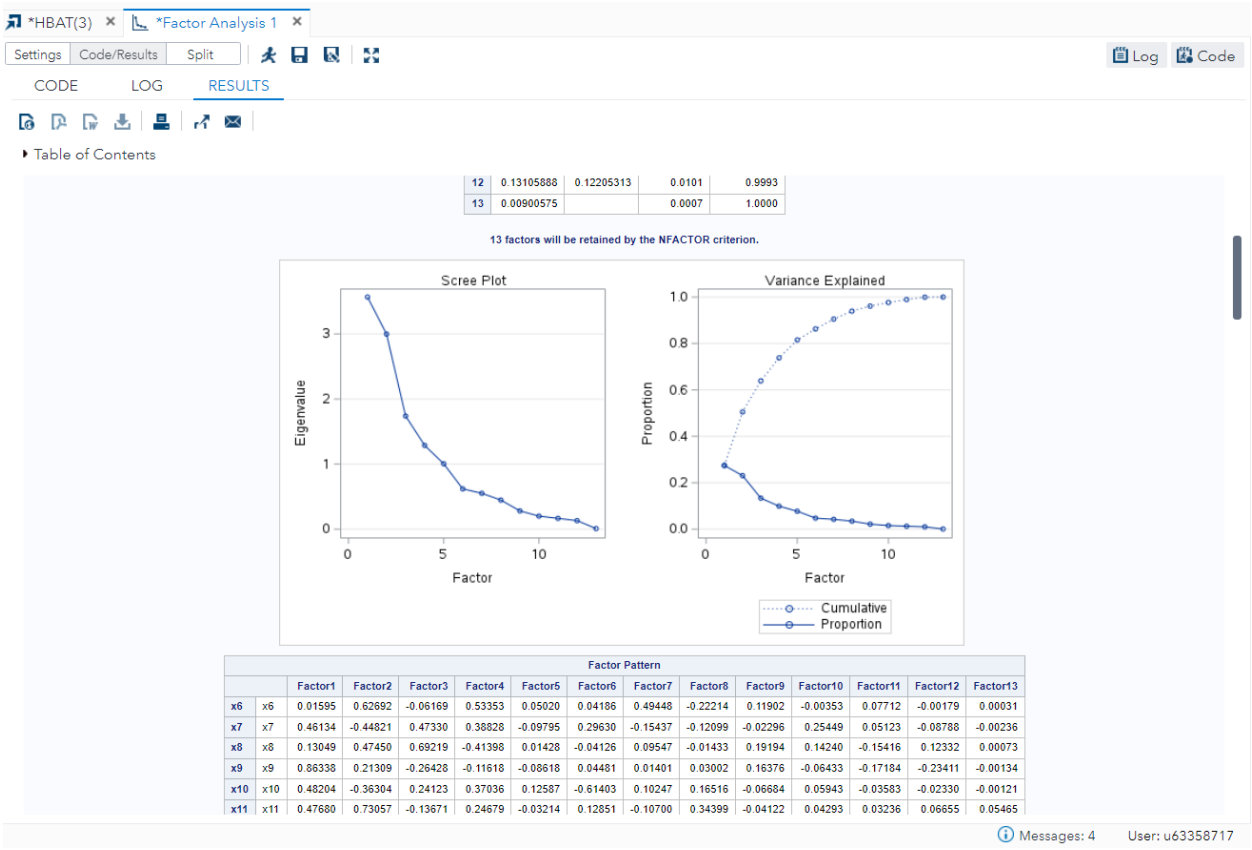
1. **For the following scree plot, what are the number of Factors? Explain**



The Scree Plot in Multivariate Data Analysis is used in Factory Analysis and in Principal Component Analysis for finding of no of factors in the graph as well as components.



From the Above Fig the Scree Plot has 5 Factors where the sudden break of curve starts, we can starts counting of factors so for the above Scree Plot has 5 factors.

2. For the following Eigenvalues tables, how many Factors are there? Explain

Eigenvalues of the Correlation Matrix: Total = 13 Average = 1				
	Eigenvalue	Difference	Proportion	Cumulative
1	3.56707480	0.56943025	0.2744	0.2744
2	2.99764455	1.25956706	0.2306	0.5050
3	1.73807749	0.45085244	0.1337	0.6387
4	1.28722505	0.28198745	0.0990	0.7377
5	1.00523760	0.38662334	0.0773	0.8150
6	0.61861426	0.06718656	0.0476	0.8626
7	0.55142770	0.10443379	0.0424	0.9050
8	0.44699392	0.16625812	0.0344	0.9394
9	0.28073579	0.08002691	0.0216	0.9610

From the reference the above table using Principal Factor Analysis achieved the below table:

Initial Factor Method: Principal Components

Prior Communality Estimates: ONE

Eigenvalues of the Correlation Matrix: Total = 13 Average = 1				
	Eigenvalue	Difference	Proportion	Cumulative
1	3.56707480	0.56943025	0.2744	0.2744
2	2.99764455	1.25956706	0.2306	0.5050
3	1.73807749	0.45085244	0.1337	0.6387
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7	0.55142770	0.10443379	0.0424	0.9050
8	0.44699392	0.16625812	0.0344	0.9394
9	0.28073579	0.08002691	0.0216	0.9610
10	0.20070888	0.03451354	0.0154	0.9764
11	0.16619534	0.03513646	0.0128	0.9892
12	0.13105888	0.12205313	0.0101	0.9993
13	0.00900575		0.0007	1.0000

13 factors will be retained by the NFACTOR criterion.

The above table Eigen Values is given it helps us to finding in the the No of Factors present in the Graph

Whereas Factor with Eigenvalues greater than 1.0 is counted as a Factor.

The above table as Eigen values of

1. 3.56707480
2. 2.99764455
3. 1.73807749
4. 1.28722505
5. 1.00523760

They are 5 values greater than 1.0

So, the above table has 5 factors.

3. For the following Factor Pattern. Assign the variables to the related factors. What issues do you see here and how to overcome them? Explain

Rotated Factor Pattern					
		Factor1	Factor2	Factor3	Factor4
x18	x18	0.94409	0.03632	0.17359	0.03358
x9	x9	0.91918	0.09055	0.11467	0.08910
x16	x16	0.86242	0.02857	0.10007	0.12376
x15	x15	0.15320	-0.00522	0.01296	-0.09033
x6	x6	0.03598	0.82310	-0.01024	-0.05342
x11	x11	0.54378	0.72157	-0.03430	0.15207
x13	x13	-0.09737	-0.69036	0.22125	-0.23675
x17	x17	0.50916	-0.75206	0.22195	-0.13211
x12	x12	0.12370	-0.15638	0.90312	0.07640
x7	x7	0.04033	-0.10407	0.87974	0.04584
x10	x10	0.17494	-0.04899	0.72129	-0.07905
x8	x8	-0.01301	0.10497	-0.01952	0.93867
x14	x14	0.07342	0.12669	0.06336	0.92618

Here for the above given factor pattern we should consider the factor loading when we consider loading as **0.5**

Then the Factor1: Variables are X18, X9, X16, X15, X11, X17, X12, X10

Factor2: Variables are X6, X11, X8, X14

Factor3: Variables are X18, X9, X16, X13, X17, X12, X7, X10

Factor2: Variables are X16, X11, X8, X14

When we consider the Factor loading as **0.6**

Then the Factor1: Variables are X18, X9, X16, X15, X12, X10

Factor2: Variables are X6, X11, X8, X14

Factor3: Variables are X18, X9, X16, X13, X17, X12, X7, X10

Factor2: Variables are X16, X11, X8, X14

Here mainly we need to change the Loading Factors to get the different variables in different factors.

4. **For the data set associated with this homework (HBAT). For variables X6 up to X18 (excluding variables X15 andX17),**

   a. **Find the Scree plot and use it to determine the number of factors.**

      Scree plot variables X6 to X18 excluding X15 and X17.

      Here the gradually where the curve suddenly break downs then factor counting starts for this, we have 5 Factors.

   b. **Find the Eigenvalues of the correlation matrix and use it to find the number of factors.**

      It has 4 Factors

   c. **Using your answer in b, find the factor pattern and use it to find which variables associate with each Factor.**

   d. **Discuss any issues in part (c) and show how you can solve them**

      Different factor loading different variables in different factors.