1. Checked if there is a patterned relationship amongst our variables

1)Determinant score(Haitovsky's test)

- test if this score is significantly different from zero which indicates an absence of multicollinearity.

- check if this score is above the rule of thumb of 0.00001 as this indicates an absence of multicollinearity. :0.00002

2) Confirming an acceptable Kaiser-Meyer-Olkin measures of sample adequacy

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.849
Bartlett's Test of Sphericity	Approx. Chi-Square	1430.067
	df	171
	Sig.	.000

- KMO : 0.849 (it is acceptable) / values closer to 1 are better

- Bartlett's Test : p: 0.000 we reject the null hypothesis

(H0: the correlation matrix is an identity matrix)

=> Our data is suitable for EFA

2. Remove crossloading variables(Rotated Factor Matrix)

- A crossloading is when an item loads at .32 or higher on two or more factors (Costello & Osborne, 2005)

- First, we choose a significant loading cut-off to make interpretation easier

(The larger the sample size, smaller loadings are allowed for a factor to be considered significant(Stevens, 2002)

- Second, the crossloading variables are dropped.

First, I got the table as follows.

Pattern Matrix[a]

	Component					
	1	2	3	4	5	6
q1	-.446					
q2				.843		
q3		.677				
q4		.434				
q5					.899	
q6			.439			
q7			.926			

q8			.832			
q9	.463					
q10	.497					
q11	-.413					
q12	.833					
q13	.846					
q14	.968					
q15	.765					
q16	.647					
q17	.606					
q18		.608				
q19				.548		
q20	.663					
q21		.747				
q22						.633
q23		.780				
q24						.812

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 12 iterations.

Since I do not want to get negative sign, I removed variable 1.

Pattern Matrix[a]

	Component					
	1	2	3	4	5	6
q2				.851		
q3		.687				
q5						.873
q6			.436			
q7			.932			
q8			.824			
q9	.452					
q10	.476					
q12	.857					
q13	.859					
q14	.967					
q15	.787					
q16	.631					
q17	.593					

q18		.605				
q19				.522		
q20	.645					
q21		.757				
q22					.664	
q23		.779				
q24					.757	
q4	.418					
q11	-.457	.413				

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 18 iterations.

I removed q11.

Structure Matrix

	Component				
	1	2	3	4	5
q2		.567			-.516
q3			.709		
q5					.759
q6		.619	.404		
q7		.735			
q8		.827			
q9	.609	.550			
q10	.614	.507			
q12	.829				
q13	.841				
q14	.864				
q15	.813				
q16	.778	.527			
q17	.717	.597			
q18			.614		
q19	.482	.635		.462	
q20	.519				
q21			.716		
q23			.747		
q24				.709	
q22				.780	

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.

I removed Q2

Pattern Matrix[a]

	Component				
	1	2	3	4	5
q3			.727		
q5					.860
q6		.566			
q7		.897			
q8		.855			
q9	.522				
q10	.558				
q12	.889				
q13	.893				
q14	.950				
q15	.872				
q16	.624				
q17	.553				
q18			.562		
q19		.405			
q20	.558				
q21			.734		
q23			.779		
q24				.642	
q22				.818	

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Remove q5, and I got the final pattern Matrix

Pattern Matrix[a]

	Component			
	1	2	3	4
q3			.715	
q6		.607		
q7		.899		
q8		.868		
q9	.499			
q10	.541			
q12	.870			

q13	.889			
q14	.957			
q15	.851			
q16	.634			
q17	.553			
q18			.548	
q19		.397		
q20	.598			
q21			.733	
q23			.791	
q24				.664
q22				.808

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

- The variables cluster into these four groups.

-This table contains the rotated factor loadings, which represent how the variables are wighted for each factor. (SPSS did not print the correlations that are 0.5 or less, because they are probably not meaningful.)
- We use Promax rotation to attain an optimal simple structure which attempts to have each variable load on a few factors as possible, but maximizes the number of high loadings on each variable. Promax is the one of the common oblique rotation techniques, which is used when the factors are considered to be correlated.

- To determine whether our rotation technique is suitable, I checked the Factor Transformation Matrix's off diagonal elements. A suitable rotation technique will result in a nearly symmetrical off-diagonal element.

Component Transformation Matrix

Component	1	2	3	4
1	1.000	.465	-.076	.092
2	.465	1.000	.192	.242
3	-.076	.192	1.000	.199
4	.092	.242	.199	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.

This transformation matrix has symmetrical off-diagonal elements. So, the rotation we selected is acceptable.

3. Determine the number of significant factors

- 1) Rotated eigenvalues

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.809	30.574	30.574	5.809	30.574	30.574	5.539
2	2.892	15.223	45.797	2.892	15.223	45.797	3.717
3	1.421	7.481	53.278	1.421	7.481	53.278	2.523
4	1.211	6.372	59.650	1.211	6.372	59.650	1.843
5	.848	4.463	64.114				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

- The factors are arranged in the descending order based on the most explained variance.

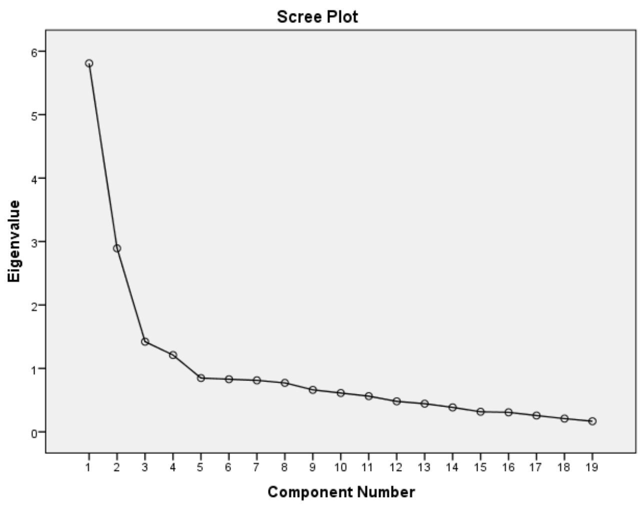
(The first factor will always account for the most variance(and hence have the highest eigenvalue), and the next factor will account for as much of the left over variance as it can and so on.)

- The Extraction Sums of Squared Loadings is identical to the Initial Eigenvalues except factors that have eigenvalues less than 1 are not shown.

(In this case, four factors are retained. so there are four rows.)

- The Rotation Sums of Squared Loadings show you the eigenvalues after Promax rotation.

2) Scree Plot



-The scree plot graphs the eigenvalue against the factor number. You can see these values in the first two columns of the table immedeiately above. From the fourth factor on, the line is almost flat, meaning the each successive factor is accounting for smaller and smaller amounts of the total variance.

4. Factor Score Covariance Matrix

- Because I did not use an orthogonal rotation, this should not be diagonal.

Component Score Covariance Matrix

Component	1	2	3
1	2.460	2.300	3.014
2	2.300	2.200	2.574
3	3.014	2.574	3.933

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalization.

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5. Principal Axis Factor

- I tried to adjust Principal Axis Factor as the data violate the assumption of multivariate normality. (Left skewed)

(Principal Axis Factor is recommended when the data violate the assumption of multivariate normality (Costello & Osborne, 2005)

- I just removed q2, q4

1. Checked if there is a patterned relationship amongst our variables

1)Determinant score(Haitovsky's test) : 3.279E-5

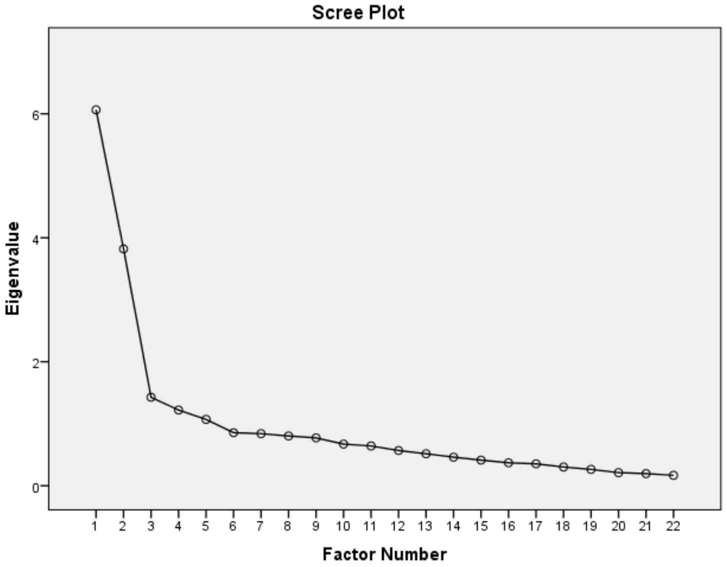
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.841
Bartlett's Test of Sphericity	Approx. Chi-Square	1732.927
	df	231
	Sig.	.000

Total Variance Explained

Factor	Initial Eigenvalues	Extraction Sums of Squared Loadings	Rotation Sums of Squared Loadings[a]

	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.063	27.561	27.561	5.684	25.838	25.838	5.524
2	3.820	17.362	44.923	3.294	14.974	40.812	2.834
3	1.427	6.484	51.407	.997	4.532	45.344	3.496
4	1.221	5.550	56.957	.629	2.859	48.203	1.819
5	1.069	4.861	61.818	.495	2.249	50.452	1.710
6	.856	3.890	65.708				



Pattern Matrix[a]

	Factor 1	2	3	4	5
q1					.465
q3		.468			
q5					.400
q6			.438		
q7			.712		
q8			.954		
q9	.462				
q10	.499				
q11					.479
q12	.864				
q13	.870				
q14	1.006				
q15	.779				
q16	.600				

q17	.578				
q18		.444			
q19				.414	
q20	.464				
q21		.656			
q22				.614	
q23		.773			
q24				.451	

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 6 iterations.