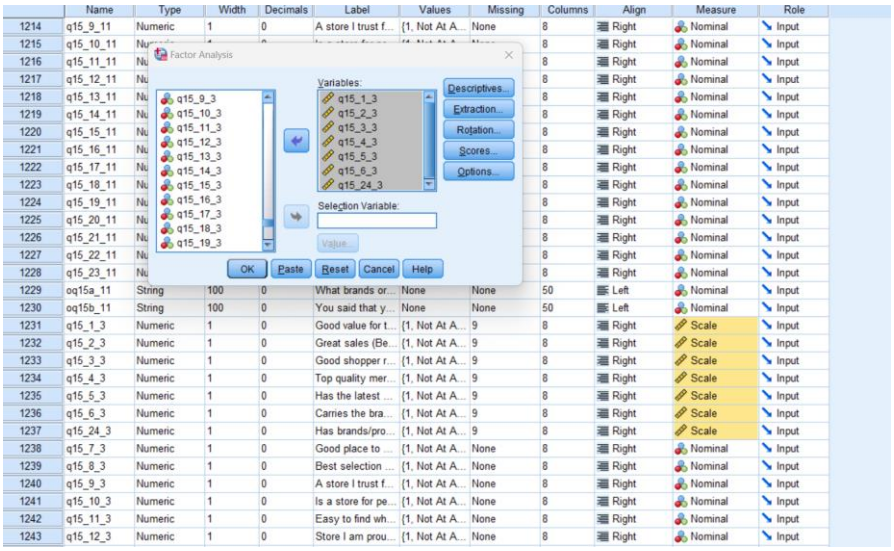
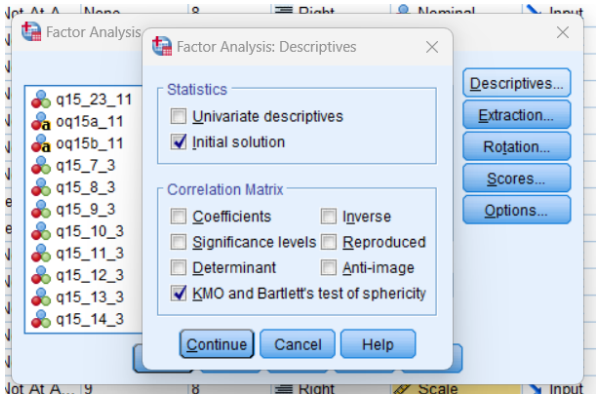
To find if there is a simpler set of factors that explains the data captured by brand imagery perception statements for Nordstrom? And Should Nordstrom be focusing on the brand imagery factors above or Brand Commitment and Likelihood to Purchase in order to increase the Likelihood of Recommendation?

Solution:
Here **Brand Imagery (Q15_3)** is the variable of interest and we observe there are some N/A so labelling them as missing values and changing the scale to Interval.

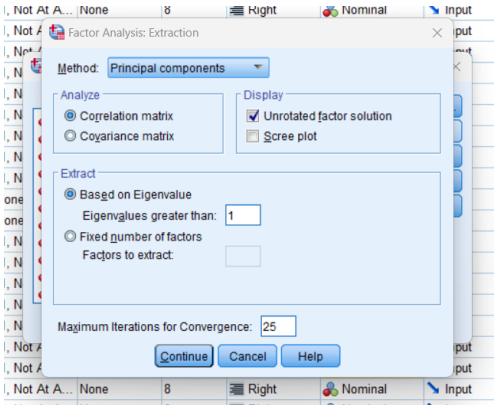
In the Analyze > Dimension Reduction > Factor Analysis with following settings



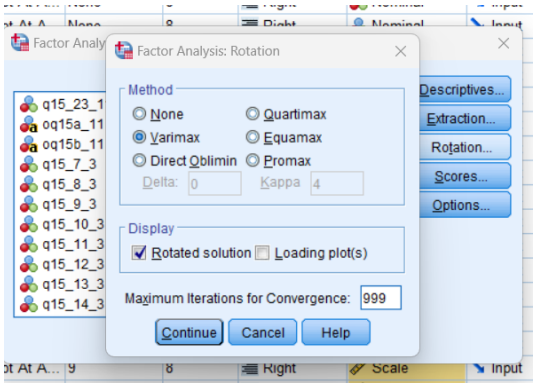
a) Enabling thew KMO and Bartlett's test of sphericity in Descriptives



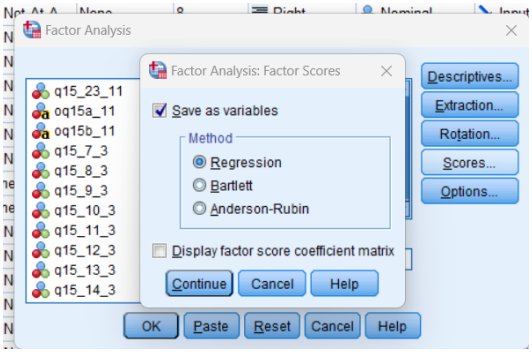
b) Performing the Principal Component Analysis in Extraction and extract factors with eigen values greater than 1.



c) Performing the Varimax method in Rotation



d) Choose Regression as method of Factor scores



The results of the above test

KMO and Bartlett's Test

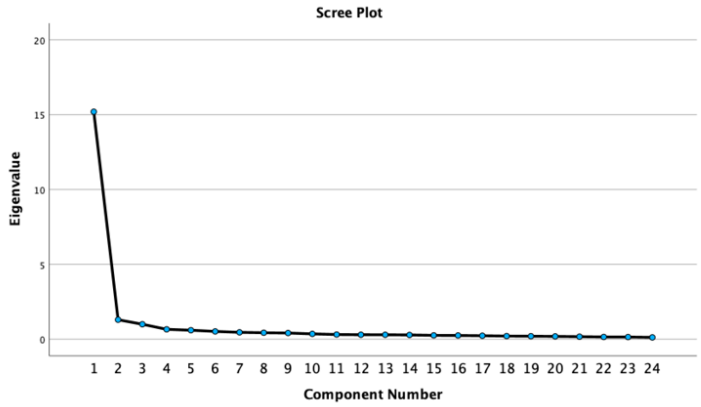
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.972
Bartlett's Test of Sphericity	Approx. Chi-Square	12211.217
	df	276
	Sig.	<.001

We perform KMO where value is between 0.5 and 1 and bartlett's test where the sphericity is rejected with significance <0.001, we can perform factor analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.194	63.309	63.309	15.194	63.309	63.309	8.524	35.518	35.518
2	1.299	5.412	68.721	1.299	5.412	68.721	7.969	33.202	68.721
3	.998	4.160	72.881						
4	.658	2.743	75.624						
5	.599	2.496	78.120						
6	.518	2.158	80.277						
7	.457	1.905	82.182						
8	.431	1.795	83.977						
9	.411	1.713	85.690						
10	.354	1.475	87.165						
11	.310	1.293	88.458						
12	.297	1.237	89.695						
13	.295	1.228	90.923						
14	.282	1.176	92.100						
15	.254	1.058	93.158						
16	.247	1.030	94.188						
17	.230	.957	95.145						
18	.206	.859	96.003						
19	.197	.822	96.825						
20	.186	.773	97.599						
21	.167	.696	98.295						
22	.148	.616	98.911						
23	.143	.594	99.505						
24	.119	.495	100.000						

Extraction Method: Principal Component Analysis.



With the setting of eigen values > 1 we get the above output. But the third factor value is 0.998 and close to 1 so we changed the setting to fix the number of factors to 3 and got the next output.

So, we observe 3 factors for brand imagery perception statements for Nordstrom.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.194	63.309	63.309	15.194	63.309	63.309	6.884	28.684	28.684
2	1.299	5.412	68.721	1.299	5.412	68.721	6.453	26.889	55.573
3	.998	4.160	72.881	.998	4.160	72.881	4.154	17.307	72.881
4	.658	2.743	75.624						
5	.599	2.496	78.120						
6	.518	2.158	80.277						
7	.457	1.905	82.182						
8	.431	1.795	83.977						
9	.411	1.713	85.690						
10	.354	1.475	87.165						
11	.310	1.293	88.458						
12	.297	1.237	89.695						
13	.295	1.228	90.923						
14	.282	1.176	92.100						
15	.254	1.058	93.158						
16	.247	1.030	94.188						
17	.230	.957	95.145						
18	.206	.859	96.003						
19	.197	.822	96.825						
20	.186	.773	97.599						
21	.167	.696	98.295						
22	.148	.616	98.911						
23	.143	.594	99.505						
24	.119	.495	100.000						

Extraction Method: Principal Component Analysis.

Based on the tables, factor 1 – has the latest styles, top quality merch, best selection of brands, store I trust, carried the brands I want, stores I am proud of, has brands I want,

good place to shop for gifts, merch worth paying more.

Factor 2 – great sales, good reward program, good value for money, inspired me to try new things, often discover new things to buy, helps express personal style, store for people like me, fun shopping experience, innovative, easy to find.

Factor 3 - available Sales people, Warm and friendly sales people, Easy return, Consistent experience, Convenient way to shop.

Rotated Component Matrix[a]

	Component		
	1	2	3
Has the latest styles & fashions (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 mean	.784		
Top quality merchandise (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means 'Does N	.771		
Best selection of brands and designers (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and	.746		
A store I trust for important occasions (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and	.734		
Carries the brands I want (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means 'Does	.702		
Store I am proud to shop at (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means 'Do	.628		
Has brands/products I want, but can't find anywhere else (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Ex	.576		
Good place to shop for gifts (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means 'D	.534	.531	
Has merchandise worth paying more for (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1	.533	.503	
Great sales (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means 'Does Not Describe		.794	
Good shopper rewards program (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5		.763	
Good value for the money (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means 'Does		.739	
Inspires me to try new things (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means '	.554	.671	
I often discover new things to buy (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 me	.560	.650	
Helps express my personal style (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means	.609	.640	

Is a store for people like me (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means '	.501	.630	
Fun and exciting shopping experience (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1	.511	.617	
Innovative in making shopping easier (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1		.596	
Easy to find what I'm looking for (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 mea	.518	.520	

Has available salespeople (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means 'Does			.782
Has warm and friendly salespeople (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 mea			.750
Makes it easy to return items (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely Well,' and 1 means '			.732
Offers a consistent experience online and in store (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremely			.578
Offers convenient ways to shop in stores and online (Below is a list of different statements that people have made about retail stores. Please read each statement and rate ^begin(1) ^Nordstrom^end(1)^ on a scale of 1 to 5, where 5 means 'Describes Extremel			.569

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

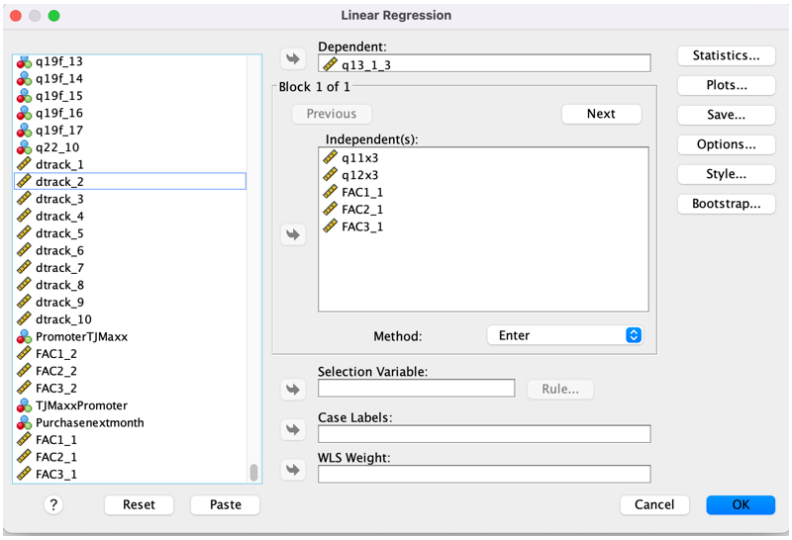
a. Rotation converged in 9 iterations.

Now to find whether NordStorm should focus on brand imagery factors above or Brand Commitment and Likelihood to Purchase in order to increase the Likelihood of Recommendation

We will perform **Mulitple linear regression on questions Brand Commitment (Q11_3), Likelihood to Purchase (Q12_3) and the 3 factors from previous question (Brand imagery) as independent variables and Likelihood of Recommendation (Q13_3) as dependent variable**.

Null Hypothesis H_0: There is no linear relationship between Brand Commitment, Likelihood to Purchases and the 3 factors from Brand imagery related to Likelihood of Recommendation for NordStorm.

From Analyze > Regression > Linear



The result of the Multiple Linear Regression is as follows:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.708[a]	.501	.495	1.263

a. Predictors: (Constant), REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1, Nordstrom Commitment, Nordstrom LTP

The independent variables are explaining **49.5%of the variance in the dependent variable from the adjusted r square**. The model is significant from the ANOVA table.

Multiple Correlation R = 0.708 -: It tells us there is **high positive correlation** Brand Commitment, Likelihood to Purchases and the 3 factors from Brand imagery related to Likelihood of Recommendation for Nordstrom.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	665.707	5	133.141	83.505	<.001[b]
	Residual	663.278	416	1.594		
	Total	1328.986	421			

a. Dependent Variable: Q13_1 (How likely are you to recommend the following retailer to friends and family members, on a scale from 0-10, where 0=Not at all likely to recommend, and 10= Will definitely recommend. Nordstrom)

b. Predictors: (Constant), REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1, Nordstrom Commitment, Nordstrom LTP

From above table, we can say that A statistically significant proportion of the variability in Likelihood of Recommendation for Nordstrom can be attributed to the regression model (since $p<0.01$ for ANOVA test).

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	8.883	.224		39.617	<.001
	Nordstrom Commitment	-.354	.078	-.203	-4.533	<.001
	Nordstrom LTP	-.071	.060	-.055	-1.193	.233
	REGR factor score 1 for analysis 1	.706	.071	.382	9.939	<.001
	REGR factor score 2 for analysis 1	.588	.078	.319	7.528	<.001
	REGR factor score 3 for analysis 1	.585	.068	.316	8.637	<.001

a. Dependent Variable: Q13_1 (How likely are you to recommend the following retailer to friends and family members, on a scale from 0-10, where 0=Not at all likely to recommend, and 10= Will definitely recommend. Nordstrom)

From the above we can conclude that,

Nordstrom's Likelihood of Recommendation = 8.883 +(-0.354*Nordstrom Commitment) +(0.706* factor 1) +(0.588*factor 2) +(0.585*factor 3)

Except the likelihood to purchase, all other factors are significant.

We can **reject the null hypothesis** and can represent the relation using the above equation and can say that if no other value changes, **a unit change increase in Nordstrom Commitment will decrease the Nordstrom's Likelihood of Recommendation by 0.354**.

Nordstrom must focus more on the factor 1 (Std. Beta coeff: 0.382) followed by factor 2 (Std. Beta coeff: 0.319), factor 3 (Std. Beta coeff: 0.316) and then finally brand commitment to Impact likelihood to recommendation (Std. Beta coeff: -0.203).