Scenario 1 *(maximum 40 points)*

Eagle Farm is a famous horse racing venue in Brisbane, Australia. The study was conducted to find out what influences the finishing positions of the horses in the race. The study focusses on a sequence of 8 races; and the following data was collected: the number of horses in a race, the results of the last race, the number of days since the last race, the weight carried by a horse, the identifying number of a horse in a race, and the age of a horse in years. The Multivariate Regression analysis was used. The results are presented in Scenario 1 – Tables Multivariate Regression Analysis 1

Question 1

a) What are outliers?
b) What are the causes of outliers?

Question 2:

Explain if Multivariate Regression Analysis is allowed for the given dataset.

(continued on next page)

Question 3:

a) Indicate which assumptions should be checked for Multivariate Regression Analysis and define each of them.

b) Test all the variables for normality. Use 5% level of significance. Indicate exactly which tables/graphs you use in your answer.

c) In case you use 1% level of significance, would your answers regarding normality change for any of the variables tested at point b?

(continued on next page)

Question 4:

Use the output of scenario 1-Multivariate Regression Analysis 1, to correctly finish (add the missing text or strip out the incorrect option) the text underneath. Unless specified differently, assume tests are two-tailed with $\alpha = 0.05$.

_____ % of the variance of the dependent variable is explained by the six independent variables. This percentage is significant/not significant, indicated by the ___-test. The null-hypothesis for this test is _____. The alternative hypothesis is _____.The test value is _____, with a significance level _____. This significance level is higher/lower than α. We reject/fail to reject the null-hypothesis.

The regression equation from the regression model in Multivariate Regression Analysis 1section is:

Question 5:

Explain which independent variables have a significant contribution in the prediction of the dependent variable. Use 5% significance level for your test.

(continued on next page)

A second Multivariate Regression Analysis was performed, the results can be found in Scenario 1 – Tables Multivariate Regression Analysis 2. Use the results from in Scenario 1 – Tables Multivariate Regression Analysis 2 to answer the following questions.

Question 6:

Indicate which model selection method was used in Multivariate Regression Analysis 2, provide the definition of this method, and write the regression equation of the final model.

Question 7:

Indicate which independent variable has the highest influence on the dependent variable in the final model (Model 3) of the regression analysis. Indicate exactly which tables you use in your answer.

(continued on next page)

Question 8:

Explain which independent variables have significant contribution to the prediction of the dependent variable in Model 3.

Question 9

In Multivariate Regression Analysis 2 three models are estimated. Explain which model you would select for predicting the dependent variable FinishingPosition. Explain which criterion you use.

(continued on next page)

Scenario 2 *(maximum 35 points)*

According to current studies, interest in ethical attitudes of business students who are likely to be future business leaders is on the increase (Borkowski and Ugras, 1998). This is probably due to the major corporate scandals that started coming to light in the late 1990s and the first decade of the 21st century. In order to better understand ethical orientation among future business leaders, an exploratory study employing Principal Component Analysis was conducted among 200 business students. The study intended to identify two evaluative dimensions, idealism vs. relativism, based on Forsyth's model.

Forsyth (1980) developed two dimensions, idealism and relativism, to classify an individual's ethical and moral judgments. Idealism refers to the degree to which an individual believes that the right decision can be made in an ethically questionable situation. Idealistic individuals believe that there is a morally correct alternative that will not harm others. Less idealistic individuals may make decisions irrespective of the impact on others. Relativism, on the other hand, refers to the rejection of universal rules in making ethical judgments and focuses on the social consequences of behaviour. High relativists evaluate the current situation and use this as the basis for making a judgment. Low relativists believe that standard rules can be applied regardless of the issue at hand.
Forsyth's dimensions are based on 20 items. In the present study a selection of 9 items is used, see below:

1. People should make certain that their actions never intentionally harm others even to a small degree.
2. Risks to another should never be tolerated, irrespective of how small the risks might be.
3. The existence of potential harm to others is always wrong, irrespective of the benefits to be gained.
4. One should never psychologically or physically harm another person.
5. One should not perform an action which might in any way threaten the dignity and welfare of another individual.
13. Moral standards should be seen as being individualistic; what one person considers to be moral may be judged to be immoral by another person.
14. Different types of moralities cannot be compared as to "rightness".
15. Questions of what is ethical for everyone can never be resolved since what is moral or immoral is up to the individual.
17. Ethical considerations in interpersonal relations are so complex that individuals should be allowed to formulate their own individual codes.

References:

Borkowski, S. C. & Ugras, Y. J. 1998. Business students and ethics: A meta-analysis. *Journal of Business Ethics*, 17 (8), 117-127.

Questions

You have to answer a couple of questions. For most of the questions, you have to check the SPSS output given in the appendix. When answering to these questions, always mention explicitly which table, matrix or graph you used to provide the answer (not mentioning this means fewer points!).

(continued on next page)

Question 1:

a) Provide the definition of factor analysis.
b) What is the difference between Principal Component Analysis – PCA (also called Component Analysis) and Common Factor Analysis (PFA)?

Question 2:

Intercollinearity is one of the statistical assumptions to be checked in case of factor analysis, and is checked using four measures. Describe each measure, based on the SPSS output (see Appendix Scenario 2, Section questions 2 – 4).

(continued on next page)

Question 3:

Based on the Scenario 2 description, and SPSS output, how many factors should be extracted (see Scenario 2, Section questions 2 – 4)? Motivate your answer.

Question 4:

a) The total variance of a variable can be divided into three types of variance. Describe each variance type.

b) Based on the SPSS output, assess the communalities of all variables (see Scenario 2, Section questions 2 – 4).

(continued on next page)

Question 5:

What is rotation and what is the difference between an Orthogonal and an Oblique rotation? Give examples of both oblique and orthogonal methods.

Question 6:

Do the un-rotated 2 factors and 3 factors solutions provide a good factor solution (see Appendix Scenario 2, Section questions 6 – 8)? Motivate your answer for each case.

(continued on next page)

Question 7:

a) Do the rotated 2 factors and 3 factors solutions provided by Varimax approach result in a good factor solution (see Appendix Scenario 2, Section questions 6 – 8)? Motivate your answer.

b) Which method (Unrotated, Varimax or Oblimin) is the most suitable, and provides the best factor solution? Motivate your answer (specify which matrices you use; see Appendix Scenario 2, Section questions 6 – 8).

(continued on next page)

Question 8:

A possible use of Factor Analysis results is to summate scales (see Appendix Scenario 2, Section questions 6 – 8).

a) What goals are sought when summated scales are created?

b) In the attempt of assessing the reliability of the summated scale, which measure is used? Based on the SPSS output, is the scale reliable or not? Argument your answer.

(continued on next page)

Scenario 3 *(maximum 25 points)*

Nutrint is a large manufacturer of nutrients. To inform customers about its products, Nutrint's marketing spending per year is high. The marketing department of Nutrint thinks that opinion and attitude towards nutrition is an important predictor of the appreciation of commercials of Nutrint.

A researcher was delegated to study the effect of various consumer attitudes on advertisement appraisal. For this, he has sent out a number of questionnaires. The researcher uses various statistical techniques to analyze the collected data. The results of the analysis are provided in the SPSS outputs in the Appendix (Scenario 3).

Question 1:

The researcher starts his analysis using a Factor Analysis (see Scenario 3, Section questions 1 – 2).

a) Given the research objective stated above, and the results that are shown in the tables, explain why the researcher uses factor analysis.

b) Is Factor Analysis allowed? Motivate your answer.

Question 2:

Considering the outcome of the first Factor Analysis, the researcher decides to do a second Factor Analysis (see Scenario 3, Section questions 1 – 2). Explain why the researcher executes a second Factor Analysis.

(continued on next page)

Question 3:

The researcher considers the results from the second Factor Analysis to proceed with the analysis (see Scenario 3, Section questions 3 – 4). Do you agree with this decision? Explain your position.

Question 4:

Consider the factor solution from Factor Analysis 2 (see Scenario 3, Section questions 3 – 4). How would you label the three factors that were found in this solution? Explain why.

Factor 1 - label: ....., because
Factor 2 – label: ....., because
Factor 3 – label: ....., because

Question 5:

The next analysis the researcher applies is Multivariate Regression Analysis (see Scenario 3, Section questions 5 – 9). He builds a regression model using the factors extracted in Factor Analysis 2 and the remaining variables from the questionnaire. Provide the regression equation for the regression model.

(continued on next page)

Question 6:

Indicate how good the regression model is that the researcher found, and if the model is significant (see Scenario 3, Section questions 5 – 9).

Question 7:

Explain which independent variables have a significant contribution to the explanation of the dependent variable y 'advertisement appraisal' (see Scenario 3, Section questions 5 – 9).

(continued on next page)

Question 8:
What would be the predicted value of the 'advertisement appraisal' variable (dependent variable) in the context of Multivariate Regression Analysis (see Scenario 3, Section questions 5 – 9),

a) if all factors are equal to 1 and the variable 'I don't like to see children's toys lying around' is equal to 2
b) if all factors are equal to 2 and the variable 'I don't like to see children's toys lying around' is equal to 0

Question 9:
Does multicollinearity provide problems in the found regression model? Motivate your answer (see Scenario 3, Section questions 5 – 9).

END OF THE EXAM

Scenario 1 – Section questions 1 – 5

Scenario MRA – Tables Multivariate Regression Analysis 1

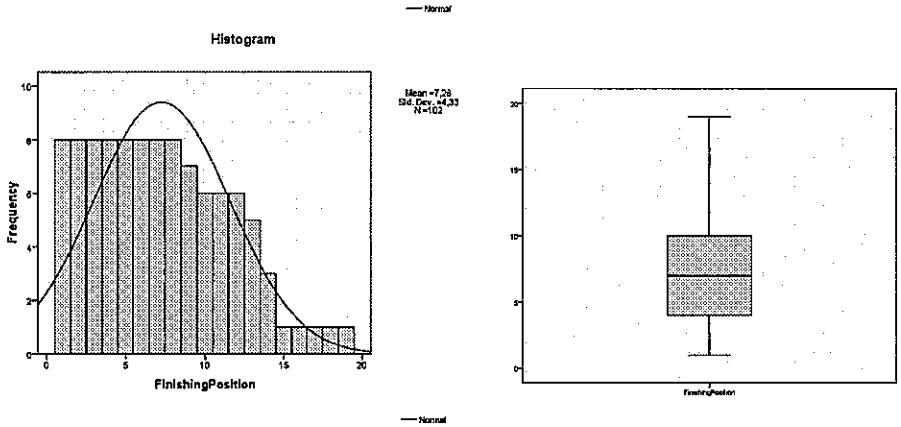
Descriptive Statistics

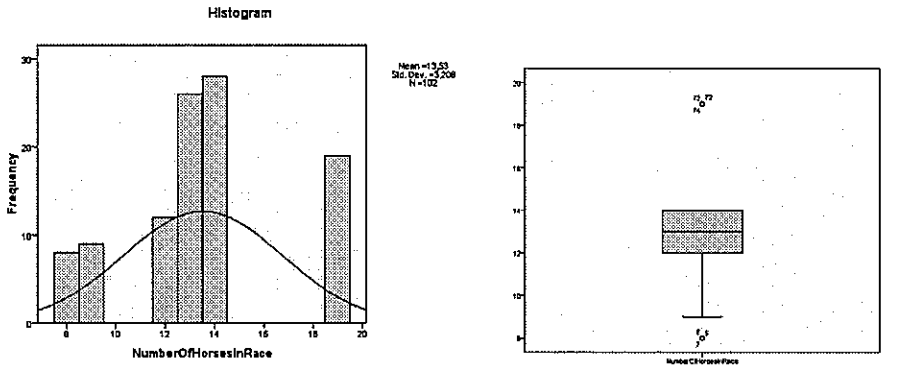
	N	Minimum	Maximum	Mean	Std. Deviation
FinishingPosition	102	1	19	7,26	4,330
NumberOfHorsesInRace	102	8	19	13,53	3,208
FinishingPositionInLast Race	102	1	20	4,98	3,939
DaysSinceLastRace	102	7	385	31,56	51,959
IdentifyingNumberOf HorseInRace	102	1	20	7,69	4,869
WeightCarried	102	49,00	59,00	52,9314	1,93590
AgeOfHorseInYears	102	3	9	5,28	1,353

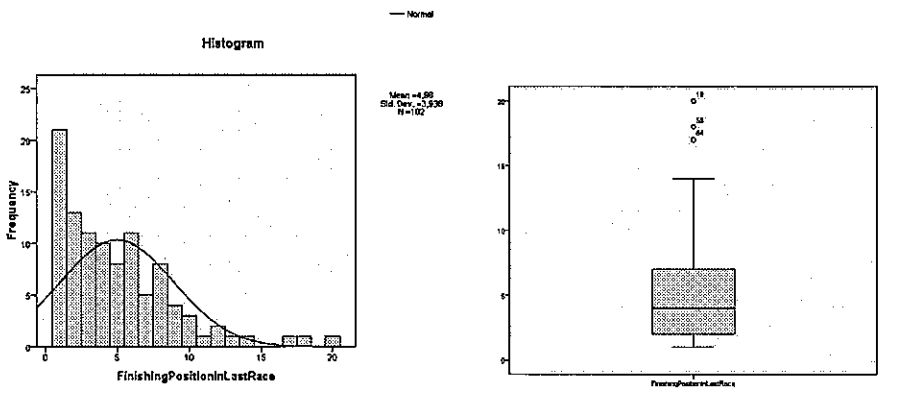
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
FinishingPosition	,092	102	,034	,960	102	,003
NumberOfHorsesInRace	,255	102	,000	,867	102	,000
FinishingPositionInLast Race	,156	102	,000	,863	102	,000
DaysSinceLastRace	,347	102	,000	,429	102	,000
IdentifyingNumberOf HorseInRace	,100	102	,014	,958	102	,003
WeightCarried	,214	102	,000	,915	102	,000
AgeOfHorseInYears	,143	102	,000	,939	102	,000

a. Lilliefors Significance Correction







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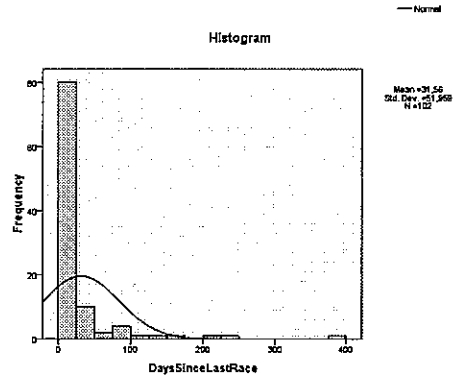
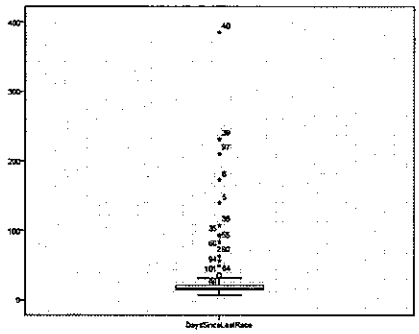
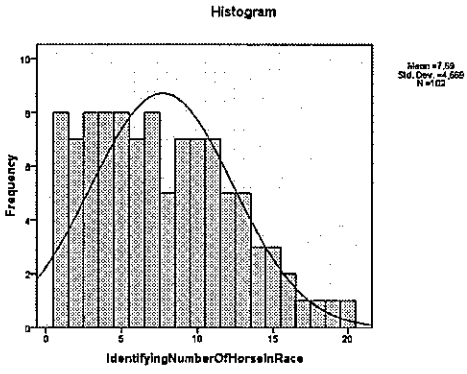
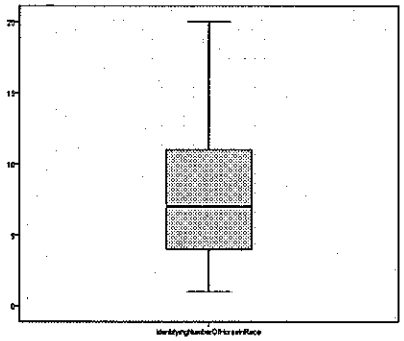
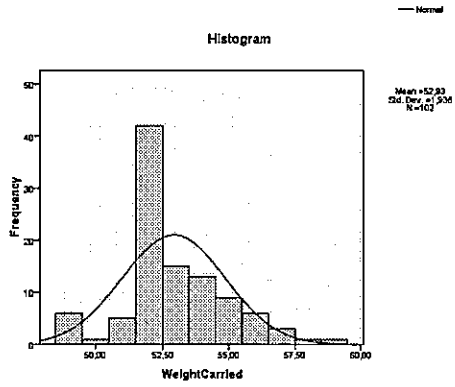
Scenario 1 – Section questions 1 – 5

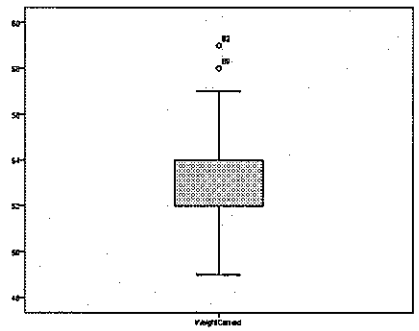


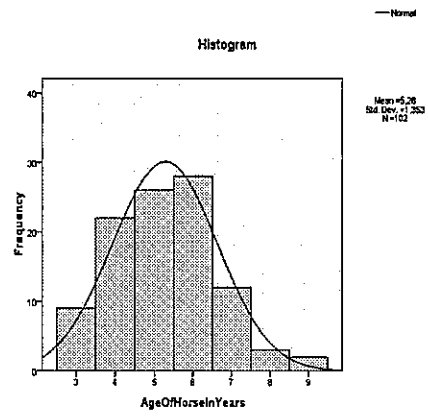


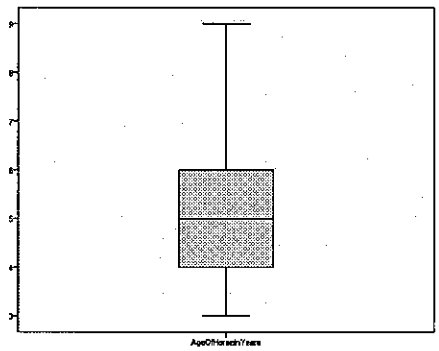












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Scenario 1 – Section questions 1 – 5

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	AgeOfHorseInYears, IdentifyingNumberOfHorseInRace, DaysSinceLastRace, FinishingPositionInLastRace, NumberOfHorsesInRace, WeightCarried[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: FinishingPosition

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,602[a]	,363	,322	3,565

a. Predictors: (Constant), AgeOfHorseInYears, IdentifyingNumberOfHorseInRace, DaysSinceLastRace, FinishingPositionInLastRace, NumberOfHorsesInRace, WeightCarried

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	686,773	6	114,462	9,008	,000[a]
	Residual	1207,080	95	12,706		
	Total	1893,853	101			

a. Predictors: (Constant), AgeOfHorseInYears, IdentifyingNumberOfHorseInRace, DaysSinceLastRace, FinishingPositionInLastRace, NumberOfHorsesInRace, WeightCarried

b. Dependent Variable: FinishingPosition

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	4,591	12,954		,354	,724					
	NumberOfHorsesInRace	,257	,138	,190	1,865	,065	,370	,188	,153	,645	1,550
	FinishingPositionInLast Race	,293	,092	,266	3,168	,002	,292	,309	,259	,950	1,052
	DaysSinceLastRace	,012	,007	,147	1,755	,083	,101	,177	,144	,963	1,039
	IdentifyingNumberOf HorseInRace	,325	,111	,350	2,936	,004	,441	,288	,240	,472	2,117
	WeightCarried	-,143	,246	-,064	-,583	,561	-,213	-,060	-,048	,556	1,798
	AgeOfHorseInYears	,463	,277	,145	1,669	,098	,219	,169	,137	,893	1,120

a. Dependent Variable: FinishingPosition

(continued on next page)

Scenario 1 – Section questions 6 – 9

Scenario MRA – Tables Multivariate Regression Analysis 2

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	IdentifyingNumberOfHorseInRace	.	Forward (Criterion: Probability-of-F-to-enter <= ,050)
2	FinishingPositionInLastRace	.	Forward (Criterion: Probability-of-F-to-enter <= ,050)
3	NumberOfHorsesInRace	.	Forward (Criterion: Probability-of-F-to-enter <= ,050)

a. Dependent Variable: FinishingPosition

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,441[a]	,194	,186	3,906
2	,543[b]	,295	,281	3,672
3	,572[c]	,327	,306	3,606

a. Predictors: (Constant), IdentifyingNumberOfHorseInRace

b. Predictors: (Constant), IdentifyingNumberOfHorseInRace, FinishingPositionInLastRace

c. Predictors: (Constant), IdentifyingNumberOfHorseInRace, FinishingPositionInLastRace, NumberOfHorsesInRace

ANOVA[d]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	368,239	1	368,239	24,137	,000[a]
	Residual	1525,614	100	15,256		
	Total	1893,853	101			
2	Regression	559,141	2	279,570	20,737	,000[b]
	Residual	1334,712	99	13,482		
	Total	1893,853	101			
3	Regression	619,379	3	206,460	15,876	,000[c]
	Residual	1274,474	98	13,005		
	Total	1893,853	101			

a. Predictors: (Constant), IdentifyingNumberOfHorseInRace

b. Predictors: (Constant), IdentifyingNumberOfHorseInRace, FinishingPositionInLastRace

c. Predictors: (Constant), IdentifyingNumberOfHorseInRace, FinishingPositionInLastRace, NumberOfHorsesInRace

d. Dependent Variable: FinishingPosition

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	4,121	,748		5,513	,000					
	IdentifyingNumberOfHorseInRace	,409	,083	,441	4,913	,000	,441	,441	,441	1,000	1,000
2	(Constant)	2,253	,860		2,619	,010					
	IdentifyingNumberOfHorseInRace	,425	,078	,459	5,428	,000	,441	,479	,458	,997	1,003
	FinishingPositionInLastRace	,350	,093	,318	3,763	,000	,292	,354	,317	,997	1,003
3	(Constant)	-,642	1,589		-,404	,687					
	IdentifyingNumberOfHorseInRace	,353	,084	,381	4,204	,000	,441	,391	,348	,837	1,194
	FinishingPositionInLastRace	,327	,092	,297	3,553	,001	,292	,338	,294	,983	1,017
	NumberOfHorsesInRace	,264	,122	,195	2,152	,034	,370	,212	,178	,834	1,199

a. Dependent Variable: FinishingPosition

(continued on next page)

Scenario 2 – Section questions 2 – 4

Scenario 2

Section questions 2 – 4

Correlation Matrix

Correlation Matrix

		Q1	Q2	Q3	Q4	Q5	Q13	Q14	Q15	Q17
Correlation	Q1	1.000	.443	.338	.316	.414	.021	.102	.040	.154
	Q2	.443	1.000	.477	.254	.423	.070	.129	.075	.149
	Q3	.338	.477	1.000	.445	.455	-.082	.072	-.013	.095
	Q4	.316	.254	.445	1.000	.608	-.075	-.061	-.028	-.009
	Q5	.414	.423	.455	.608	1.000	.014	-.036	.077	-.074
	Q13	.021	.070	-.082	-.075	.014	1.000	.419	.601	.397
	Q14	.102	.129	.072	-.061	-.036	.419	1.000	.413	.398
	Q15	.040	.075	-.013	-.028	.077	.601	.413	1.000	.368
	Q17	.154	.149	.095	-.009	-.074	.397	.398	.368	1.000
Sig. (1-tailed)	Q1		.000	.000	.000	.000	.398	.106	.312	.029
	Q2	.000		.000	.001	.000	.198	.057	.179	.034
	Q3	.000	.000		.000	.000	.160	.189	.437	.123
	Q4	.000	.001	.000		.000	.179	.229	.366	.455
	Q5	.000	.000	.000	.000		.434	.330	.175	.182
	Q13	.398	.198	.160	.179	.434		.000	.000	.000
	Q14	.106	.057	.189	.229	.330	.000		.000	.000
	Q15	.312	.179	.437	.366	.175	.000	.000		.000
	Q17	.029	.034	.123	.455	.182	.000	.000	.000	

Anti-image Matrices

		Q1	Q2	Q3	Q4	Q5	Q13	Q14	Q15	Q17
Anti-image Covariance	Q1	.712	-.179	-.021	-.045	-.122	.026	-.043	.027	-.099
	Q2	-.179	.640	-.202	.066	-.122	-.027	-.032	.015	-.049
	Q3	-.021	-.202	.624	-.141	-.085	.082	-.060	.016	-.065
	Q4	-.045	.066	-.141	.578	-.258	.023	.030	.025	-.044
	Q5	-.122	-.122	-.085	-.258	.488	-.039	.048	-.073	.130
	Q13	.026	-.027	.082	.023	-.039	.568	-.120	-.267	-.128
	Q14	-.043	-.032	-.060	.030	.048	-.120	.717	-.125	-.143
	Q15	.027	.015	.016	.025	-.073	-.267	-.125	.587	-.096
	Q17	-.099	-.049	-.065	-.044	.130	-.128	-.143	-.096	.709
Anti-image Correlation	Q1	.809[a]	-.265	-.032	-.071	-.207	.041	-.060	.042	-.140
	Q2	-.265	.748[a]	-.320	.109	-.218	-.045	-.048	.025	-.073
	Q3	-.032	-.320	.778[a]	-.234	-.154	.137	-.090	.026	-.098
	Q4	-.071	.109	-.234	.699[a]	-.486	.040	.046	.042	-.069
	Q5	-.207	-.218	-.154	-.486	.686[a]	-.073	.082	-.136	.222
	Q13	.041	-.045	.137	.040	-.073	.691[a]	-.188	-.462	-.201
	Q14	-.060	-.048	-.090	.046	.082	-.188	.800[a]	-.193	-.201
	Q15	.042	.025	.026	.042	-.136	-.462	-.193	.697[a]	-.149
	Q17	-.140	-.073	-.098	-.069	.222	-.201	-.201	-.149	.728[a]

a. Measures of Sampling Adequacy(MSA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.731
Bartlett's Test of Sphericity	Approx. Chi-Square	368.828
	df	36
	Sig.	.000

(continued on next page)

Scenario 2 – Section questions 2 – 4

Section questions 2 – 4

Communalities

	Initial	Extraction
Q1	1.000	.548
Q2	1.000	.640
Q3	1.000	.590
Q4	1.000	.712
Q5	1.000	.798
Q13	1.000	.737
Q14	1.000	.563
Q15	1.000	.749
Q17	1.000	.595

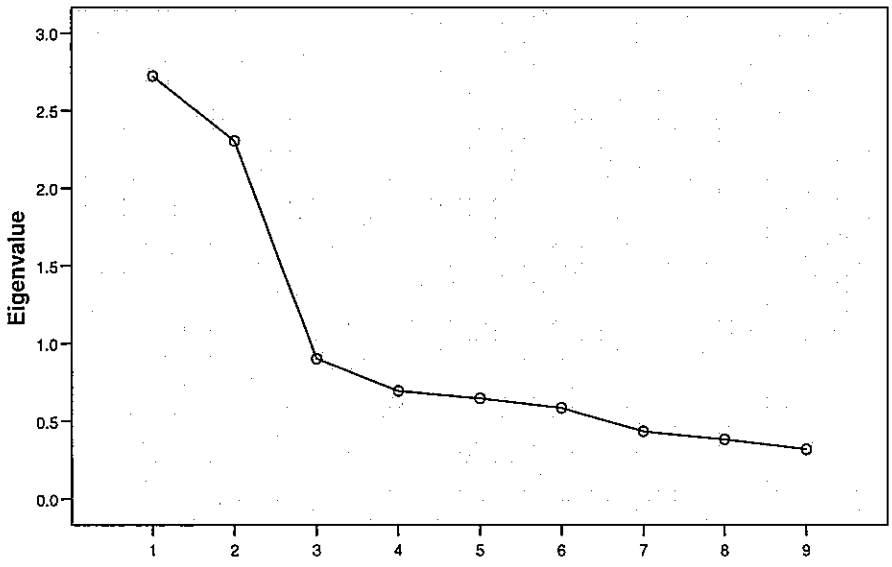
Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.723	30.257	30.257	2.723	30.257	30.257	2.288	25.418	25.418
2	2.305	25.614	55.871	2.305	25.614	55.871	1.971	21.905	47.324
3	.902	10.026	65.897	.902	10.026	65.897	1.672	18.573	65.897
4	.695	7.721	73.618						
5	.648	7.197	80.815						
6	.587	6.518	87.333						
7	.435	4.834	92.167						
8	.384	4.270	96.436						
9	.321	3.564	100.000						

Extraction Method: Principal Component Analysis.

Scree Plot



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Scenario 2 – Section questions 6 – 8

Section questions 6 – 8

3 factors solution

Component Matrix[a]

	Component		
	1	2	3
Q5	.751	-.291	.386
Q2	.715	-.053	-.355
Q3	.713	-.234	-.165
Q1	.674	-.090	-.293
Q4	.654	-.345	.406
Q13	.200	.782	.292
Q15	.258	.743	.361
Q14	.261	.680	-.179
Q17	.287	.640	-.321

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

Rotated Component Matrix[a]

	Component		
	1	2	3
Q13	.847	-.114	.074
Q15	.841	-.110	.172
Q14	.679	.245	-.207
Q17	.621	.358	-.284
Q2	.088	.777	.170
Q1	.053	.710	.204
Q3	-.046	.672	.369
Q5	.018	.354	.820
Q4	-.057	.273	.796

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

a. Rotation converged in 6 iterations.

Component Transformation Matrix

Component	1	2	3
1	.288	.761	.581
2	.938	-.102	-.332
3	.193	-.641	.743

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

Pattern Matrix[a]

	Component		
	1	2	3
Q2	.789	-.025	.055
Q1	.714	-.040	.101
Q3	.653	-.098	.281
Q15	-.145	.896	.187
Q13	-.136	.884	.085
Q14	.278	.590	-.261
Q17	.408	.495	-.359
Q5	.261	.117	.799
Q4	.180	.054	.787

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

a. Rotation converged in 12 iterations.

Structure Matrix

	Component		
	1	2	3
Q2	.797	.097	.246
Q1	.731	.062	.277
Q3	.704	-.035	.452
Q13	.031	.847	-.091
Q15	.048	.842	.007
Q14	.314	.678	-.291
Q17	.405	.621	-.342
Q5	.470	.031	.842
Q4	.376	-.044	.821

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

Component Correlation Matrix

Component	1	2	3
1	1.000	.166	.237
2	.166	1.000	-.162
3	.237	-.162	1.000

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

(continued on next page)

Scenario 2 – Section questions 6 – 8

Section questions 6 – 8

2 factors solution

Component Matrix[a]

	Component	
	1	2
Q5	.751	-.291
Q2	.715	-.053
Q3	.713	-.234
Q1	.674	-.090
Q4	.654	-.345
Q13	.200	.782
Q15	.258	.743
Q14	.261	.680
Q17	.287	.640

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Rotated Component Matrix[a]

	Component	
	1	2
Q5	.805	-.046
Q3	.750	-.004
Q4	.729	-.127
Q2	.697	.169
Q1	.669	.121
Q13	-.050	.806
Q15	.017	.786
Q14	.040	.728
Q17	.076	.697

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

a. Rotation converged in 3 iterations.

Component Transformation Matrix

Component	1	2
1	.952	.307
2	-.307	.952

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

Pattern Matrix[a]

	Component	
	1	2
Q5	.807	-.071
Q3	.751	-.026
Q4	.733	-.149
Q2	.693	.149
Q1	.666	.101
Q13	-.073	.808
Q15	-.006	.787
Q14	.018	.727
Q17	.056	.696

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

a. Rotation converged in 3 iterations.

Structure Matrix

	Component	
	1	2
Q5	.803	-.023
Q3	.750	.018
Q4	.724	-.106
Q2	.701	.190
Q1	.672	.141
Q13	-.025	.804
Q15	.041	.786
Q14	.062	.728
Q17	.097	.699

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

Component Correlation Matrix

Component	1	2
1	1.000	.059
2	.059	1.000

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

Reliability Statistics

Cronbach's Alpha	N of Items
.684	9

(continued on next page)

Scenario 3 – Section questions 1 – 2

Scenario 3

Section questions 1 – 2

Descriptive Statistics

	Mean	Std. Deviation	Analysis N
A person can save a lot of money by shopping around for bargains.	3,64	1,064	50
If we drink milk we don't have to worry about nutrition.	1,78	,764	50
Today's foods have so many nutrients added that I don't have to worry about nutrition.	1,74	,853	50
I usually watch the advertisements for announcements of sales.	3,64	1,064	50
I shop a lot for "specials".	3,36	1,083	50
I am concerned about getting my family to eat nutritious foods throughout the day.	3,92	,804	50
Nutrition is important and one should not be careless about it.	4,30	,814	50
Nutrition is not so important as long as we eat a lot.	1,58	,702	50
I find myself checking the prices in the grocery store even for small items.	3,72	1,011	50
I feel that foods we eat will affect our future health.	4,06	,793	50
I don't like to see children's toys lying about.	3,38	1,176	50

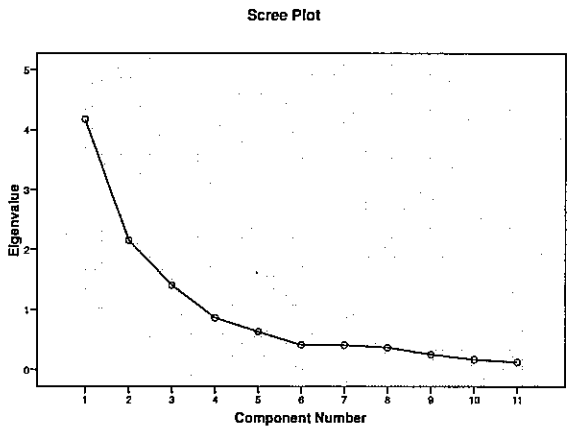
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,725
Bartlett's Test of Sphericity	Approx. Chi-Square	266,262
	df	55
	Sig.	,000

Communalities

	Initial	Extraction
A person can save a lot of money by shopping around for bargains.	1,000	,601
If we drink milk we don't have to worry about nutrition.	1,000	,784
Today's foods have so many nutrients added that I don't have to worry about nutrition.	1,000	,733
I usually watch the advertisements for announcements of sales.	1,000	,707
I shop a lot for "specials".	1,000	,834
I am concerned about getting my family to eat nutritious foods throughout the day.	1,000	,753
Nutrition is important and one should not be careless about it.	1,000	,860
Nutrition is not so important as long as we eat a lot.	1,000	,686
I find myself checking the prices in the grocery store even for small items.	1,000	,712
I feel that foods we eat will affect our future health.	1,000	,799
I don't like to see children's toys lying about.	1,000	,272

Extraction Method: Principal Component Analysis.



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Scenario 3 – Section questions 1 – 2

Section questions 1 – 2

Correlation Matrix(a)

		A person can save a lot of money by shopping around for bargains.	If we drink milk we don't have to worry about nutrition.	Today's foods have so many nutrients added that I don't have to worry about nutrition.	I usually watch the advertisements for announcements of sales.	I shop a lot for "specials"	I am concerned about getting my family to eat nutritious foods throughout the day.	Nutrition is important and one should not be careless about it.	Nutrition is not so important as long as we eat a lot.	I find myself checking the prices in the grocery store even for small items.	I feel that foods we eat will affect our future health.	I don't like to see children's toys lying about.
Correlation	A person can save a lot of money by shopping around for bargains.	1,000	-,125	-,128	,550	,557	,395	,457	,148	,473	,413	,356
	If we drink milk we don't have to worry about nutrition.	-,125	1,000	,631	,001	-,050	,104	,075	,547	,077	-,011	,118
	Today's foods have so many nutrients added that I don't have to worry about nutrition.	-,128	,631	1,000	-,060	-,051	,118	-,091	,461	,032	-,037	,162
	I usually watch the advertisements for announcements of sales.	,550	,001	-,060	1,000	,699	,419	,386	,094	,606	,340	,307
	I shop a lot for "specials".	,557	-,050	-,051	,699	1,000	,291	,245	,149	,746	,354	,291
	I am concerned about getting my family to eat nutritious foods throughout the day.	,395	,104	,118	,419	,291	1,000	,754	,084	,474	,616	,249
	Nutrition is important and one should not be careless about it.	,457	,075	-,091	,386	,245	,754	1,000	-,061	,402	,761	,219
	Nutrition is not so important as long as we eat a lot.	,148	,547	,461	,094	,149	,084	-,061	1,000	,176	-,174	,049
	I find myself checking the prices in the grocery store even for small items.	,473	,077	,032	,606	,746	,474	,402	,176	1,000	,429	,314
	I feel that foods we eat will affect our future health.	,413	-,011	-,037	,340	,354	,616	,761	-,174	,429	1,000	,369
	I don't like to see children's toys lying about.	,356	,118	,162	,307	,291	,249	,219	,049	,314	,369	1,000
Sig. (1-tailed)	A person can save a lot of money by shopping around for bargains.		,194	,188	,000	,000	,002	,000	,152	,000	,001	,006
	If we drink milk we don't have to worry about nutrition.	,194		,000	,497	,364	,237	,301	,000	,297	,469	,208
	Today's foods have so many nutrients added that I don't have to worry about nutrition.	,188	,000		,339	,362	,207	,265	,000	,412	,400	,131
	I usually watch the advertisements for announcements of sales.	,000	,497	,339		,000	,001	,003	,258	,000	,008	,015
	I shop a lot for "specials".	,000	,364	,362	,000		,020	,043	,151	,000	,006	,020
	I am concerned about getting my family to eat nutritious foods throughout the day.	,002	,237	,207	,001	,020		,000	,281	,000	,000	,041
	Nutrition is important and one should not be careless about it.	,000	,301	,265	,003	,043	,000		,338	,002	,000	,063
	Nutrition is not so important as long as we eat a lot.	,152	,000	,000	,258	,151	,281	,338		,111	,114	,368
	I find myself checking the prices in the grocery store even for small items.	,000	,297	,412	,000	,000	,000	,002	,111		,001	,013
	I feel that foods we eat will affect our future health.	,001	,469	,400	,008	,006	,000	,000	,114	,001		,004
	I don't like to see children's toys lying about.	,006	,208	,131	,015	,020	,041	,063	,368	,013	,004	

a Determinant = ,003

(continued on next page)

Scenario 3 – Section questions 1 – 2

Section questions 1 – 2

Anti-image Matrices

		A person can save a lot of money by shopping around for bargains.	If we drink milk we don't have to worry about nutrition.	Today's foods have so many nutrients added that I don't have to worry about nutrition.	I usually watch the advertisements for announcements of sales.	I shop a lot for "specials".	I am concerned about getting my family to eat nutritious foods throughout the day.	Nutrition is important and one should not be careless about it.	Nutrition is not so important as long as we eat a lot.	I find myself checking the prices in the grocery store even for small items.	I feel that foods we eat will affect our future health.	I don't like to see children's toys lying about.
Anti-image Covariance	A person can save a lot of money by shopping around for bargains.	,468	,121	,024	-,072	-,082	,019	-,084	-,151	,022	,001	-,143
	If we drink milk we don't have to worry about nutrition.	,121	,431	-,226	-,035	,027	,076	-,090	-,205	-,026	,015	-,057
	Today's foods have so many nutrients added that I don't have to worry about nutrition.	,024	-,226	,490	,025	,007	-,115	,101	-,086	,013	-,053	-,075
	I usually watch the advertisements for announcements of sales.	-,072	-,035	,025	,419	-,155	-,056	-,036	,045	-,020	,067	-,058
	I shop a lot for "specials".	-,082	,027	,007	-,155	,281	,036	,056	-,040	-,178	-,072	,027
	I am concerned about getting my family to eat nutritious foods throughout the day.	,019	,076	-,115	-,056	,036	,344	-,147	-,051	-,072	-,020	-,003
	Nutrition is important and one should not be careless about it.	-,084	-,090	,101	-,036	,056	-,147	,221	,021	-,013	-,149	,068
	Nutrition is not so important as long as we eat a lot.	-,151	-,205	-,086	,045	-,040	-,051	,021	,515	-,026	,105	,055
	I find myself checking the prices in the grocery store even for small items.	,022	-,026	,013	-,020	-,178	-,072	-,013	-,026	,358	-,007	-,039
	I feel that foods we eat will affect our future health.	,001	,015	-,053	,067	-,072	-,020	-,149	,105	-,007	,314	-,126
	I don't like to see children's toys lying about.	-,143	-,057	-,075	-,058	,027	-,003	,068	,055	-,039	-,126	,725
Anti-image Correlation	A person can save a lot of money by shopping around for bargains.	,803(a)	,270	,051	-,162	-,225	,047	-,261	-,308	,055	,003	-,245
	If we drink milk we don't have to worry about nutrition.	,270	,534(a)	-,492	-,083	,078	,197	-,291	-,434	-,066	,040	-,101
	Today's foods have so many nutrients added that I don't have to worry about nutrition.	,051	-,492	,586(a)	,055	,020	-,280	,306	-,171	,032	-,134	-,125
	I usually watch the advertisements for announcements of sales.	-,162	-,083	,055	,837(a)	-,451	-,149	-,119	,096	-,053	,184	-,105
	I shop a lot for "specials".	-,225	,078	,020	-,451	,709(a)	,116	,226	-,104	-,561	-,241	,060
	I am concerned about getting my family to eat nutritious foods throughout the day.	,047	,197	-,280	-,149	,116	,772(a)	-,532	-,122	-,205	-,060	-,007
	Nutrition is important and one should not be careless about it.	-,261	-,291	,306	-,119	,226	-,532	,654(a)	,061	-,046	-,564	,170
	Nutrition is not so important as long as we eat a lot.	-,308	-,434	-,171	,096	-,104	-,122	,061	,597(a)	-,061	,260	,089
	I find myself checking the prices in the grocery store even for small items.	,055	-,066	,032	-,053	-,561	-,205	-,046	-,061	,830(a)	-,021	-,077
	I feel that foods we eat will affect our future health.	,003	,040	-,134	,184	-,241	-,060	-,564	,260	-,021	,751(a)	-,263
	I don't like to see children's toys lying about.	-,245	-,101	-,125	-,105	,060	-,007	,170	,089	-,077	-,263	,765(a)

a Measures of Sampling Adequacy(MSA)

(continued on next page)

Scenario 3 – Section questions 1 – 2

Section questions 1 – 2

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	4,175	37,955	37,955	4,175	37,955	37,955	3,013	27,389	27,389
2	2,157	19,607	57,562	2,157	19,607	57,562	2,570	23,360	50,750
3	1,409	12,805	70,367	1,409	12,805	70,367	2,158	19,618	70,367
4	,865	7,865	78,232						
5	,638	5,800	84,032						
6	,418	3,800	87,832						
7	,412	3,741	91,573						
8	,372	3,378	94,950						
9	,255	2,319	97,269						
10	,172	1,563	98,832						
11	,128	1,168	100,000						

Extraction Method: Principal Component Analysis.

Component Matrix(a)

	Component		
	1	2	3
A person can save a lot of money by shopping around for bargains.	,731	-,114	-,230
If we drink milk we don't have to worry about nutrition.	,058	,862	,192
Today's foods have so many nutrients added that I don't have to worry about nutrition.	,004	,842	,155
I usually watch the advertisements for announcements of sales.	,757	-,027	-,365
I shop a lot for "specials".	,737	-,015	-,538
I am concerned about getting my family to eat nutritious foods throughout the day.	,739	,062	,451
Nutrition is important and one should not be careless about it.	,740	-,124	,546
Nutrition is not so important as long as we eat a lot.	,118	,782	-,247
I find myself checking the prices in the grocery store even for small items.	,788	,088	-,290
I feel that foods we eat will affect our future health.	,737	-,174	,475
I don't like to see children's toys lying about.	,500	,150	,002

Extraction Method: Principal Component Analysis.
a 3 components extracted.

Rotated Component Matrix(a)

	Component		
	1	2	3
A person can save a lot of money by shopping around for bargains.	,705	,308	-,094
If we drink milk we don't have to worry about nutrition.	-,074	,110	,875
Today's foods have so many nutrients added that I don't have to worry about nutrition.	-,091	,048	,850
I usually watch the advertisements for announcements of sales.	,813	,215	-,016
I shop a lot for "specials".	,910	,070	-,017
I am concerned about getting my family to eat nutritious foods throughout the day.	,271	,814	,129
Nutrition is important and one should not be careless about it.	,209	,902	-,049
Nutrition is not so important as long as we eat a lot.	,256	-,177	,767
I find myself checking the prices in the grocery store even for small items.	,788	,282	,106
I feel that foods we eat will affect our future health.	,252	,851	-,104
I don't like to see children's toys lying about.	,380	,312	,174

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 5 iterations.

(continued on next page)

Scenario 3 – Section questions 3 – 4

Section questions 3 – 4

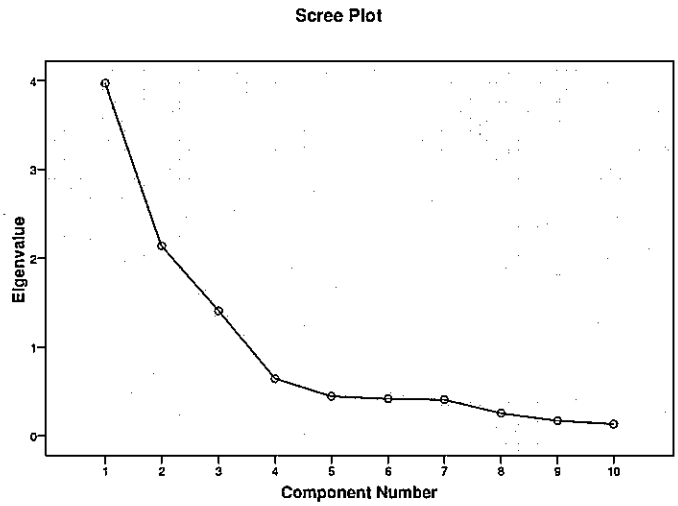
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,721
Bartlett's Test of Sphericity	Approx. Chi-Square	253,855
	df	45
	Sig.	,000

Communalities

	Initial	Extraction
A person can save a lot of money by shopping around for bargains.	1,000	,593
If we drink milk we don't have to worry about nutrition.	1,000	,786
Today's foods have so many nutrients added that I don't have to worry about nutrition.	1,000	,723
I usually watch the advertisements for announcements of sales.	1,000	,714
I shop a lot for "specials".	1,000	,841
I am concerned about getting my family to eat nutritious foods throughout the day.	1,000	,774
Nutrition is important and one should not be careless about it.	1,000	,879
Nutrition is not so important as long as we eat a lot.	1,000	,704
I find myself checking the prices in the grocery store even for small items.	1,000	,724
I feel that foods we eat will affect our future health.	1,000	,789

Extraction Method: Principal Component 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	3,975	39,745	39,745	3,975	39,745	39,745	2,876	28,762	28,762
2	2,141	21,410	61,155	2,141	21,410	61,155	2,508	25,084	53,846
3	1,409	14,086	75,241	1,409	14,086	75,241	2,140	21,395	75,241
4	,643	6,435	81,676						
5	,446	4,456	86,132						
6	,418	4,176	90,308						
7	,406	4,058	94,366						
8	,255	2,555	96,920						
9	,173	1,728	98,649						
10	,135	1,351	100,000						

Extraction Method: Principal Component Analysis.

(continued on next page)

Scenario 3 – Section questions 3 – 4

Section questions 3 – 4

Anti-image Matrices

		A person can save a lot of money by shopping around for bargains.	If we drink milk we don't have to worry about nutrition.	Today's foods have so many nutrients added that I don't have to worry about nutrition.	I usually watch the advertisements for announcements of sales.	I shop a lot for "specials".	I am concerned about getting my family to eat nutritious foods throughout the day.	Nutrition is important and one should not be careless about it.	Nutrition is not so important as long as we eat a lot.	I find myself checking the prices in the grocery store even for small items.	I feel that foods we eat will affect our future health.
Anti-image Covariance	A person can save a lot of money by shopping around for bargains.	,498	,118	,011	-,089	-,081	,019	-,077	-,151	,016	-,027
	If we drink milk we don't have to worry about nutrition.	,118	,436	-,238	-,041	,030	,076	-,088	-,204	-,029	,005
	Today's foods have so many nutrients added that I don't have to worry about nutrition.	,011	-,238	,498	,020	,010	-,117	,113	-,082	,009	-,072
	I usually watch the advertisements for announcements of sales.	-,089	-,041	,020	,423	-,155	-,057	-,032	,050	-,024	,062
	I shop a lot for "specials".	-,081	,030	,010	-,155	,282	,036	,056	-,042	-,179	-,072
	I am concerned about getting my family to eat nutritious foods throughout the day.	,019	,076	-,117	-,057	,036	,344	-,151	-,052	-,072	-,022
	Nutrition is important and one should not be careless about it.	-,077	-,088	,113	-,032	,056	-,151	,228	,016	-,010	-,151
	Nutrition is not so important as long as we eat a lot.	-,151	-,204	-,082	,050	-,042	-,052	,016	,519	-,024	,124
	I find myself checking the prices in the grocery store even for small items.	,016	-,029	,009	-,024	-,179	-,072	-,010	-,024	,361	-,015
	I feel that foods we eat will affect our future health.	-,027	,005	-,072	,062	-,072	-,022	-,151	,124	-,015	,337
Anti-image Correlation	A person can save a lot of money by shopping around for bargains.	,827(a)	,254	,021	-,195	-,217	,047	-,229	-,297	,037	-,066
	If we drink milk we don't have to worry about nutrition.	,254	,532(a)	-,511	-,095	,084	,198	-,280	-,429	-,074	,014
	Today's foods have so many nutrients added that I don't have to worry about nutrition.	,021	-,511	,562(a)	,043	,028	-,284	,334	-,162	,022	-,175
	I usually watch the advertisements for announcements of sales.	-,195	-,095	,043	,833(a)	-,448	-,150	-,103	,107	-,061	,163
	I shop a lot for "specials".	-,217	,084	,028	-,448	,703(a)	,116	,220	-,110	-,559	-,234
	I am concerned about getting my family to eat nutritious foods throughout the day.	,047	,198	-,284	-,150	,116	,761(a)	-,538	-,122	-,206	-,065
	Nutrition is important and one should not be careless about it.	-,229	-,280	,334	-,103	,220	-,538	,661(a)	,047	-,034	-,547
	Nutrition is not so important as long as we eat a lot.	-,297	-,429	-,162	,107	-,110	-,122	,047	,597(a)	-,054	,295
	I find myself checking the prices in the grocery store even for small items.	,037	-,074	,022	-,061	-,559	-,206	-,034	-,054	,825(a)	-,043
	I feel that foods we eat will affect our future health.	-,066	,014	-,175	,163	-,234	-,065	-,547	,295	-,043	,757(a)

a Measures of Sampling Adequacy(MSA)

(continued on next page)

Scenario 3 – Section questions 3 – 4

Section questions 3 – 4

Component Matrix(a)

	Component		
	1	2	3
A person can save a lot of money by shopping around for bargains.	,729	-,096	-,230
If we drink milk we don't have to worry about nutrition.	,034	,865	,192
Today's foods have so many nutrients added that I don't have to worry about nutrition.	-,029	,835	,155
I usually watch the advertisements for announcements of sales.	,762	-,002	-,365
I shop a lot for "specials".	,742	,009	-,538
I am concerned about getting my family to eat nutritious foods throughout the day.	,749	,092	,451
Nutrition is important and one should not be careless about it.	,756	-,093	,546
Nutrition is not so important as long as we eat a lot.	,109	,794	-,246
I find myself checking the prices in the grocery store even for small items.	,792	,115	-,290
I feel that foods we eat will affect our future health.	,733	-,158	,475

Extraction Method: Principal Component Analysis.
a 3 components extracted.

Rotated Component Matrix(a)

	Component		
	1	2	3
A person can save a lot of money by shopping around for bargains.	,700	,310	-,088
If we drink milk we don't have to worry about nutrition.	-,083	,105	,876
Today's foods have so many nutrients added that I don't have to worry about nutrition.	-,107	,037	,842
I usually watch the advertisements for announcements of sales.	,815	,223	-,003
I shop a lot for "specials".	,914	,079	-,003
I am concerned about getting my family to eat nutritious foods throughout the day.	,274	,823	,146
Nutrition is important and one should not be careless about it.	,213	,912	-,032
Nutrition is not so important as long as we eat a lot.	,260	-,172	,779
I find myself checking the prices in the grocery store even for small items.	,790	,291	,121
I feel that foods we eat will affect our future health.	,241	,849	-,102

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 5 iterations.

(continued on next page)

Scenario 3 – Section questions 5 – 9

Section questions 5 – 9

Correlations

		advertisement appraisal	REGR factor score 1 for analysis 1	REGR factor score 2 for analysis 1	REGR factor score 3 for analysis 1	I don't like to see children's toys lying about.
Pearson Correlation	advertisement appraisal	1,000	,369	,319	,212	,445
	REGR factor score 1 for analysis 1	,369	1,000	,000	,000	,303
	REGR factor score 2 for analysis 1	,319	,000	1,000	,000	,254
	REGR factor score 3 for analysis 1	,212	,000	,000	1,000	,117
	I don't like to see children's toys lying about.	,445	,303	,254	,117	1,000
Sig. (1-tailed)	advertisement appraisal	.	,004	,012	,070	,001
	REGR factor score 1 for analysis 1	,004	.	,500	,500	,016
	REGR factor score 2 for analysis 1	,012	,500	.	,500	,038
	REGR factor score 3 for analysis 1	,070	,500	,500	.	,209
	I don't like to see children's toys lying about.	,001	,016	,038	,209	.
N	advertisement appraisal	50	50	50	50	50
	REGR factor score 1 for analysis 1	50	50	50	50	50
	REGR factor score 2 for analysis 1	50	50	50	50	50
	REGR factor score 3 for analysis 1	50	50	50	50	50
	I don't like to see children's toys lying about.	50	50	50	50	50

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	I don't like to see children's toys lying about., REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1(a)	.	Enter

a All requested variables entered.
b Dependent Variable: advertisement appraisal

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,588(a)	,345	,287	8,774	,345	5,931	4	45	,001

a Predictors: (Constant), I don't like to see children's toys lying about., REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

(continued on next page)

Scenario 3 – Section questions 5 – 9

Section questions 5 – 9

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1826,218	4	456,555	5,931	,001(a)
	Residual	3464,282	45	76,984		
	Total	5290,500	49			

a Predictors: (Constant), I don't like to see children's toys lying about., REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1
b Dependent Variable: advertisement appraisal

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	76,320	4,144		18,416	,000					
	REGR factor score 1 for analysis 1	2,971	1,321	,286	2,249	,029	,369	,318	,271	,900	1,111
	REGR factor score 2 for analysis 1	2,595	1,301	,250	1,994	,052	,319	,285	,241	,928	1,078
	REGR factor score 3 for analysis 1	1,867	1,264	,180	1,477	,147	,212	,215	,178	,984	1,016
	I don't like to see children's toys lying about.	2,420	1,170	,274	2,069	,044	,445	,295	,250	,830	1,205

a Dependent Variable: advertisement appraisal

Scenario 3 – Section questions 5 – 9

When are factor loadings considered significant?

Factor loading	Sample size needed
.30	350
.35	250
.40	200
.45	150
.50	120
.55	100
.60	85
.65	70
.70	60
.75	50