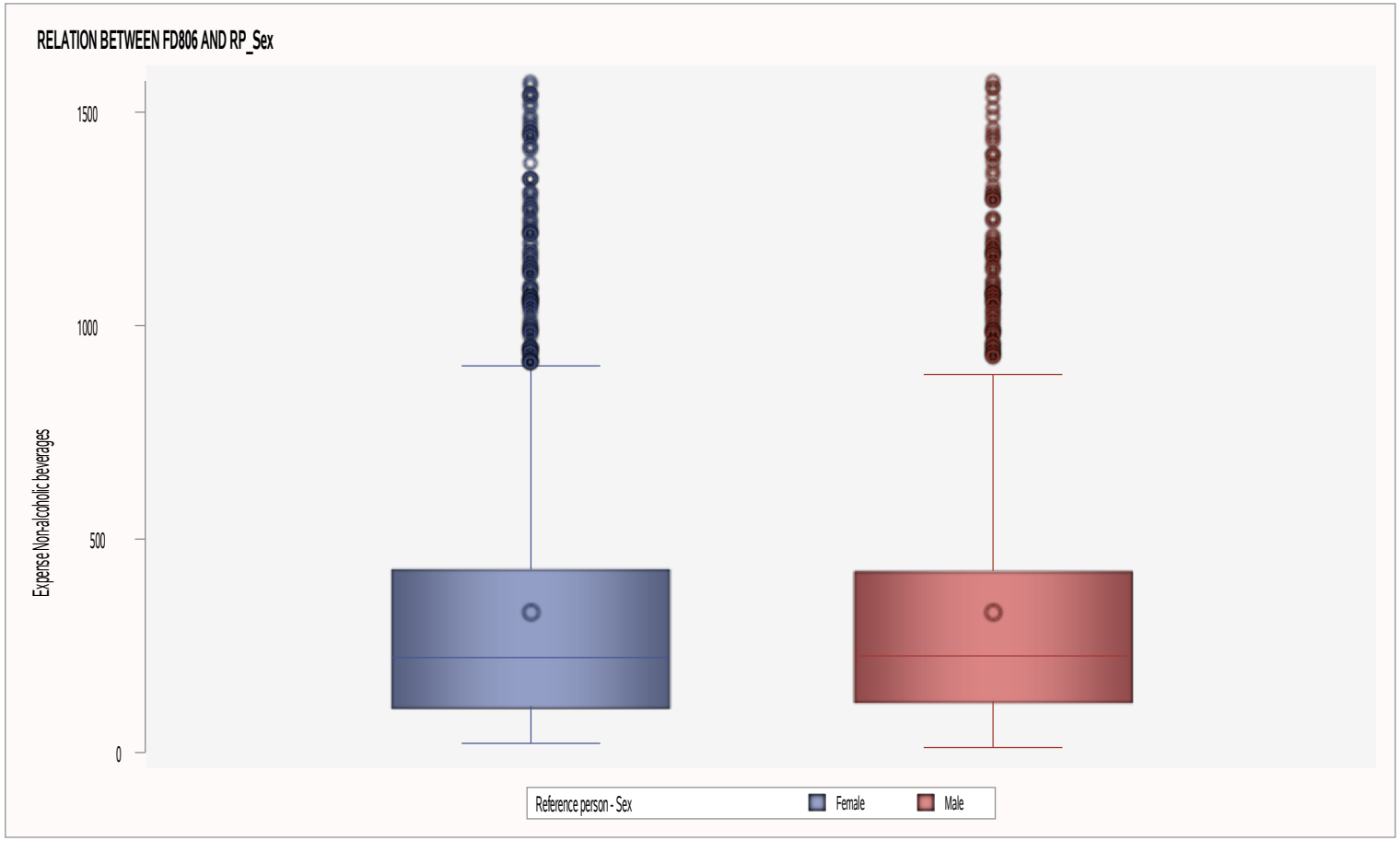
BIVARIATE ANALYSIS OF RP_Sex AND FD806 FOR ANA.MODEL1
RELATION BETWEEN FD806 AND RP_Sex

The MEANS Procedure

Analysis Variable : FD806 Expense Non-alcoholic beverages														
Reference person - Sex	N Obs	N	N Miss	Minimum	Lower Quartile	Median	Mean	Upper Quartile	Maximum	Quartile Range	Coeff of Variation	Lower 95% CL for Mean	Upper 95% CL for Mean	Skewness
Female	4262186	4262186	0	21.58	104.72	222.56	326.98	428.81	1569.37	324.09	94.95	326.68	327.27	1.72
Male	3866690	3866690	0	11.83	116.22	226.42	326.74	425.26	1573.00	309.04	89.52	326.45	327.03	1.57



T-test - Road map:

Null hypothesis: There's no difference in means
Assumptions:
1.Sample distribution must be normal:
e.g:Shapiro (null hypothesis: sample has a normal distribution)
CLT :
a.If it looks normal and each group have more than 30 observations
b.If moderately skewed, each group must have more than 100 observations
2.Groups are independent of one another.
3.There are no major outliers.
4.A check for unequal variances will help determine which version of an independent samples t-test is most appropriate:
(e.g:Levene's test, null hypothesis: equal variances)
a.If variances are equal, then a pooled t-test is appropriate
b.If variances are unequal, then a Satterthwaite (also known as Welch's) t-test is appropriate

Normal Distribution?
Null hypothesis: sample has a normal distribution
CLT :
a.If it looks normal and each group have more than 30 observations
b.If moderately skewed, each group must have more than 100 observations
*rule of thumb: If skewness is between -1 and -0.5 or between 0.5 and 1, the distribution is moderately skewed.
*if the sample size is over 2000, the Kolmgorov test should be used. If the sample size is less than 2000, the Shapiro test is better.

The UNIVARIATE Procedure
Variable: FD806 (Expense Non-alcoholic beverages)

Freq: WeightD

Reference person - Sex=Female

Moments			
N	4262186	**Sum Weights**	4262186
Mean	326.978148	**Sum Observations**	1393641686
Std Deviation	310.478872	**Variance**	96397.1302
Skewness	1.71690926	**Kurtosis**	2.83833535
Uncorrected SS	8.66553E11	**Corrected SS**	4.10862E11
Coeff Variation	94.9540127	**Std Error Mean**	0.15038892

Basic Statistical Measures			
Location		**Variability**	
Mean	326.9781	**Std Deviation**	310.47887
Median	222.5600	**Variance**	96397
Mode	657.3000	**Range**	1548
		Interquartile Range	324.09000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	2174.217	**Pr > |t|**	<.0001
Sign	**M**	2131093	**Pr >= |M|**	<.0001
Signed Rank	**S**	4.542E12	**Pr >= |S|**	<.0001

The UNIVARIATE Procedure
Variable: FD806 (Expense Non-alcoholic beverages)

Freq: WeightD

Reference person - Sex=Female

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.164481	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	41312.01	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	240753.3	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	1569.37
99%	1464.24
95%	1001.63
90%	775.63
75% Q3	428.81
50% Median	222.56
25% Q1	104.72
10%	54.08
5%	46.66
1%	27.72
0% Min	21.58

The UNIVARIATE Procedure
Variable: FD806 (Expense Non-alcoholic beverages)

Freq: WeightD

Reference person - Sex=Female

Extreme Observations					
Lowest			Highest		
Value	Freq	Obs	Value	Freq	Obs
21.58	840	982	1540.64	1345	216
21.58	347	743	1540.76	776	632
21.84	1372	141	1546.22	669	79
21.84	3250	59	1561.82	491	704
22.36	381	1177	1569.37	4907	407

The UNIVARIATE Procedure
Variable: FD806 (Expense Non-alcoholic beverages)

Freq: WeightD

Reference person - Sex=Male

Moments			
N	3866690	Sum Weights	3866690
Mean	326.739492	Sum Observations	1263400325
Std Deviation	292.484616	Variance	85547.2504
Skewness	1.57119709	Kurtosis	2.23729428
Uncorrected SS	7.43587E11	Corrected SS	3.30785E11
Coeff Variation	89.5161507	Std Error Mean	0.14874191

The UNIVARIATE Procedure
Variable: FD806 (Expense Non-alcoholic beverages)

Freq: WeightD

Reference person - Sex=Male

Basic Statistical Measures			
Location		**Variability**	
Mean	326.7395	**Std Deviation**	292.48462
Median	226.4200	**Variance**	85547
Mode	386.9000	**Range**	1561
		Interquartile Range	309.04000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	2196.688	**Pr > |t|**	<.0001
Sign	**M**	1933345	**Pr >= |M|**	<.0001
Signed Rank	**S**	3.738E12	**Pr >= |S|**	<.0001

Tests for Normality				
Test	**Statistic**		**p Value**	
Kolmogorov-Smirnov	**D**	0.156824	**Pr > D**	<0.0100
Cramer-von Mises	**W-Sq**	35050.33	**Pr > W-Sq**	<0.0050
Anderson-Darling	**A-Sq**	201427.2	**Pr > A-Sq**	<0.0050

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	1573.00
99%	1300.78
95%	985.14
90%	741.01

The UNIVARIATE Procedure
Variable: FD806 (Expense Non-alcoholic beverages)

Freq: WeightD

Reference person - Sex=Male

Quantiles (Definition 5)	
Level	**Quantile**
75% Q3	425.26
50% Median	226.42
25% Q1	116.22
10%	65.70
5%	50.75
1%	21.28
0% Min	11.83

Extreme Observations					
Lowest			**Highest**		
Value	**Freq**	**Obs**	**Value**	**Freq**	**Obs**
11.83	3940	1946	1511.64	5649	1395
14.08	15313	2157	1534.26	1566	1654
15.08	1520	2184	1556.41	1360	1997
20.54	4062	2091	1557.89	759	2302
20.80	8060	2250	1573.00	43	1742

Null hypothesis: equal variances
a.If variances are equal, then a pooled t-test is appropriate
b.If variances are unequal, then a Satterthwaite (also known as Welch's) test is appropriate

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
RP_Sex	2	Female Male

Number of Observations Read	2327
Number of Observations Used	2327
Sum of Frequencies Read	8128876
Sum of Frequencies Used	8128876

The GLM Procedure

Dependent Variable: FD806 Expense Non-alcoholic beverages

Frequency: WeightD

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	115475.02759	115475.02759	1.27	0.2606
Error	8.13E6	741647014366	91236.13115		
Corrected Total	8.13E6	741647129841			

R-Square	Coeff Var	Root MSE	FD806 Mean
0.000000	92.40926	302.0532	326.8646

Source	DF	Type I SS	Mean Square	F Value	Pr > F
RP_Sex	1	115475.0286	115475.0286	1.27	0.2606

Source	DF	Type III SS	Mean Square	F Value	Pr > F
RP_Sex	1	115475.0286	115475.0286	1.27	0.2606

The GLM Procedure

Levene's Test for Homogeneity of FD806 Variance ANOVA of Absolute Deviations from Group Means					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
RP_Sex	1	1.5525E8	1.5525E8	3886.75	<.0001
Error	8.13E6	3.247E11	39943.6		

Welch's ANOVA for FD806			
Source	DF	F Value	Pr > F
RP_Sex	1.0000	1.27	0.2592
Error	8117345		

The GLM Procedure

Level of RP_Sex	N	FD806	
		Mean	Std Dev
Female	4262186	326.978148	310.478872
Male	3866690	326.739492	292.484616

The TTEST Procedure

Variable: FD806 (Expense Non-alcoholic beverages)

Frequency: WeightD

RP_Sex	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
Female		4262186	327.0	310.5	0.1504	21.5800	1569.4
Male		3866690	326.7	292.5	0.1487	11.8300	1573.0
Diff (1-2)	Pooled		0.2387	302.1	0.2121		
Diff (1-2)	Satterthwaite		0.2387		0.2115		

The TTEST Procedure

Variable: FD806 (Expense Non-alcoholic beverages)

RP_Sex	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
Female		327.0	326.7	327.3	310.5	310.3	310.7
Male		326.7	326.4	327.0	292.5	292.3	292.7
Diff (1-2)	**Pooled**	0.2387	-0.1771	0.6544	302.1	301.9	302.2
Diff (1-2)	**Satterthwaite**	0.2387	-0.1759	0.6532			

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	8.13E6	1.13	0.2606
Satterthwaite	Unequal	8.12E6	1.13	0.2592

Equality of Variances				
Method	**Num DF**	**Den DF**	**F Value**	**Pr > F**
Folded F	4.26E6	3.87E6	1.13	<.0001

The TTEST Procedure

Variable: FD806 (Expense Non-alcoholic beverages)