Sales Distribution by Product Category (Adjusted)

ANOVA for Product Category and Sales

The ANOVA Procedure

Class Level Information		
Class	Levels	Values
ITEM TYPE	8	BEER DUNNAG KEGS LIQUOR NON-AL REF STR_SU WINE

Number of Observations Read	30000
Number of Observations Used	30000

ANOVA for Product Category and Sales

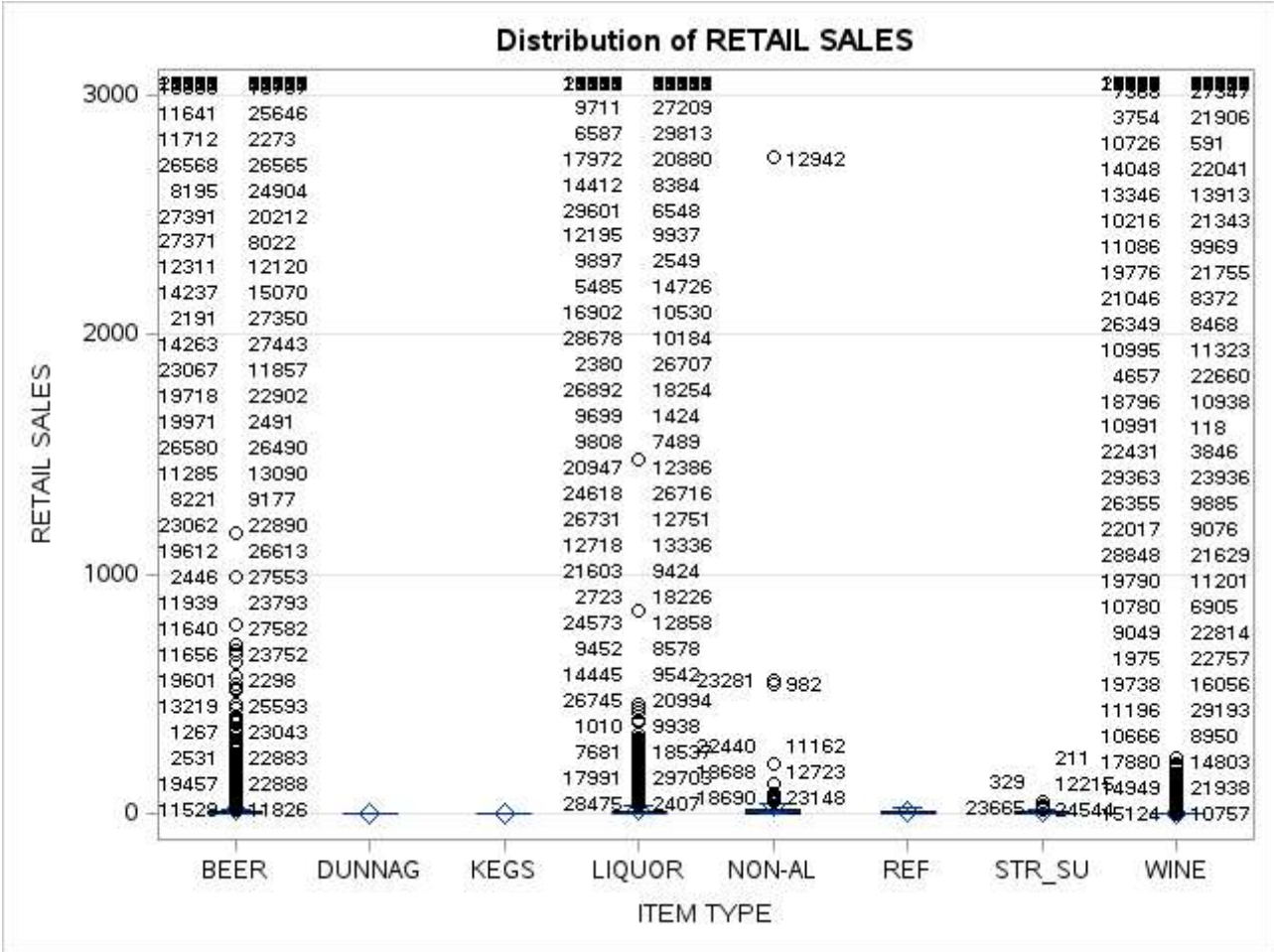### The ANOVA Procedure

Dependent Variable: RETAIL SALES

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	919322.47	131331.78	123.44	<.0001
Error	29992	31909172.41	1063.92		
Corrected Total	29999	32828494.88			

R-Square	Coeff Var	Root MSE	RETAIL SALES Mean
0.028004	470.0114	32.61783	6.939796

Source	DF	Anova SS	Mean Square	F Value	Pr > F
ITEM TYPE	7	919322.4704	131331.7815	123.44	<.0001

ANOVA for Product Category and Sales

The ANOVA Procedure

Distribution of RETAIL SALES

ANOVA for Product Category and Sales

The ANOVA Procedure

Tukey's Studentized Range (HSD) Test for RETAIL SALES

Note: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	29992
Error Mean Square	1063.923
Critical Value of Studentized Range	4.28661

Comparisons significant at the 0.05 level are indicated by ***.				
ITEM TYPE Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
NON-AL - BEER	17.5088	10.6116	24.4061	***
NON-AL - LIQUOR	17.9924	11.1452	24.8396	***

ITEM TYPE Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
Comparisons significant at the 0.05 level are indicated by ***.				
NON-AL - REF	25.8438	-9.7526	61.4403	
NON-AL - STR_SU	26.1419	11.9853	40.2985	***
NON-AL - WINE	28.4323	21.6664	35.1981	***
NON-AL - KEGS	31.6276	24.0545	39.2007	***
NON-AL - DUNNAG	31.6276	3.3935	59.8617	***
BEER - NON-AL	-17.5088	-24.4061	-10.6116	***
BEER - LIQUOR	0.4836	-1.5035	2.4706	
BEER - REF	8.3350	-26.6532	43.3232	
BEER - STR_SU	8.6330	-3.9158	21.1819	
BEER - WINE	10.9234	9.2378	12.6090	***
BEER - KEGS	14.1187	10.3220	17.9155	***
BEER - DUNNAG	14.1187	-13.3445	41.5819	
LIQUOR - NON-AL	-17.9924	-24.8396	-11.1452	***
LIQUOR - BEER	-0.4836	-2.4706	1.5035	
LIQUOR - REF	7.8514	-27.1269	42.8297	
LIQUOR - STR_SU	8.1495	-4.3720	20.6709	
LIQUOR - WINE	10.4398	8.9723	11.9074	***
LIQUOR - KEGS	13.6352	9.9300	17.3403	***
LIQUOR - DUNNAG	13.6352	-13.8155	41.0859	
REF - NON-AL	-25.8438	-61.4403	9.7526	
REF - BEER	-8.3350	-43.3232	26.6532	
REF - LIQUOR	-7.8514	-42.8297	27.1269	
REF - STR_SU	0.2980	-36.8100	37.4061	
REF - WINE	2.5884	-32.3741	37.5509	
REF - KEGS	5.7838	-29.3439	40.9114	
REF - DUNNAG	5.7838	-38.6433	50.2108	
STR_SU - NON-AL	-26.1419	-40.2985	-11.9853	***
STR_SU - BEER	-8.6330	-21.1819	3.9158	
STR_SU - LIQUOR	-8.1495	-20.6709	4.3720	
STR_SU - REF	-0.2980	-37.4061	36.8100	
STR_SU - WINE	2.2904	-10.1868	14.7675	
STR_SU - KEGS	5.4857	-7.4469	18.4184	
STR_SU - DUNNAG	5.4857	-24.6318	35.6032	
WINE - NON-AL	-28.4323	-35.1981	-21.6664	***
WINE - BEER	-10.9234	-12.6090	-9.2378	***
WINE - LIQUOR	-10.4398	-11.9074	-8.9723	***
WINE - REF	-2.5884	-37.5509	32.3741	
WINE - STR_SU	-2.2904	-14.7675	10.1868	
WINE - KEGS	3.1953	-0.3572	6.7479	
WINE - DUNNAG	3.1953	-24.2352	30.6258	
KEGS - NON-AL	-31.6276	-39.2007	-24.0545	***
KEGS - BEER	-14.1187	-17.9155	-10.3220	***
KEGS - LIQUOR	-13.6352	-17.3403	-9.9300	***
KEGS - REF	-5.7838	-40.9114	29.3439	
KEGS - STR_SU	-5.4857	-18.4184	7.4469	
KEGS - WINE	-3.1953	-6.7479	0.3572	
KEGS - DUNNAG	0.0000	-27.6407	27.6407	

Comparisons significant at the 0.05 level are indicated by ***.				
ITEM TYPE Comparison	**Difference Between Means**	**Simultaneous 95% Confidence Limits**		
DUNNAG - NON-AL	-31.6276	-59.8617	-3.3935	***
DUNNAG - BEER	-14.1187	-41.5819	13.3445	
DUNNAG - LIQUOR	-13.6352	-41.0859	13.8155	
DUNNAG - REF	-5.7838	-50.2108	38.6433	
DUNNAG - STR_SU	-5.4857	-35.6032	24.6318	
DUNNAG - WINE	-3.1953	-30.6258	24.2352	
DUNNAG - KEGS	0.0000	-27.6407	27.6407	

Two-Way ANOVA for Seasonal Trends and Product Categories

The ANOVA Procedure

Class Level Information		
Class	**Levels**	**Values**
Season	4	Fall Spring Summer Winter
ITEM TYPE	8	BEER DUNNAG KEGS LIQUOR NON-AL REF STR_SU WINE

Number of Observations Read	30000
Number of Observations Used	30000

Two-Way ANOVA for Seasonal Trends and Product Categories
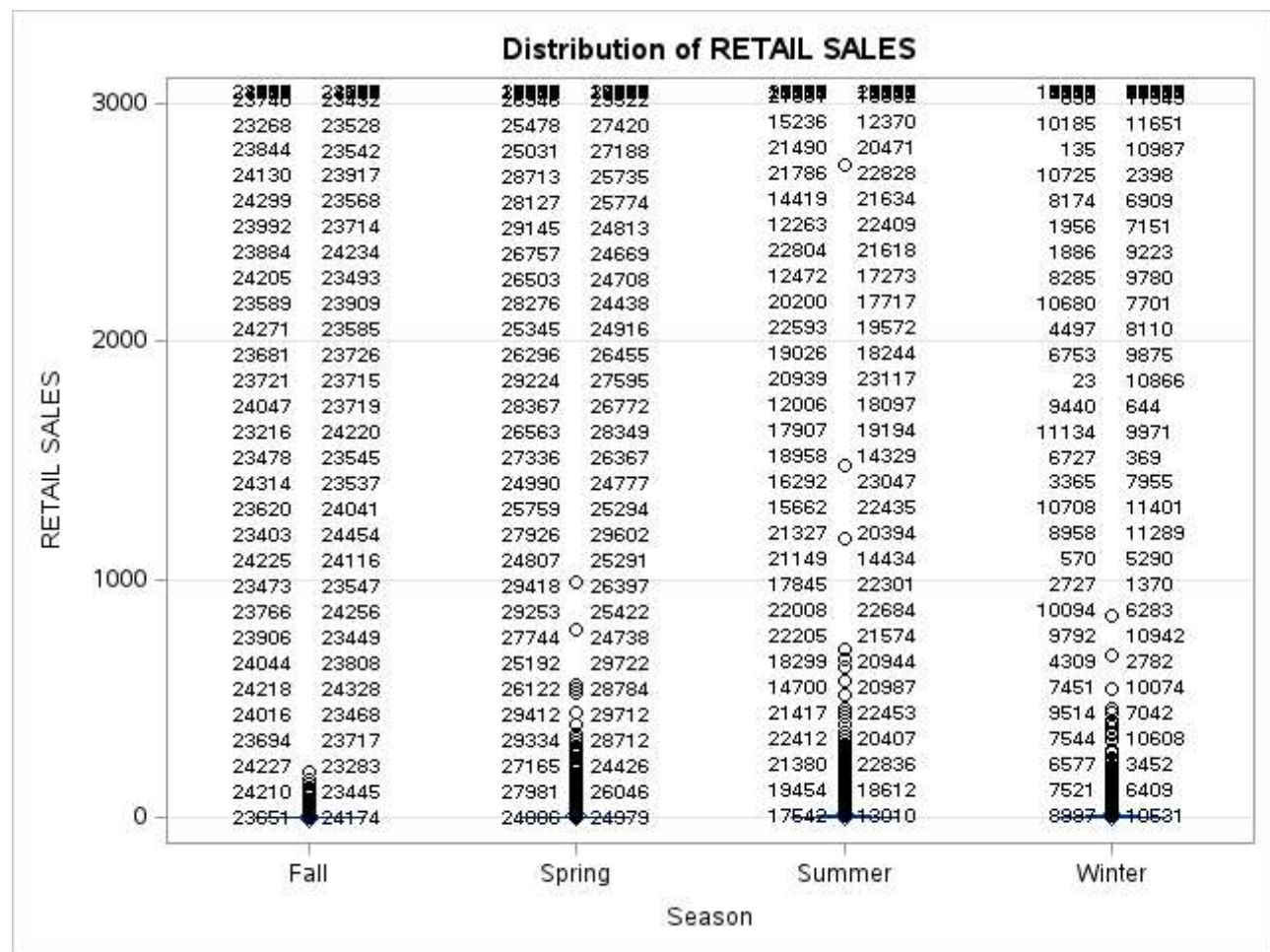
The ANOVA Procedure

Dependent Variable: RETAIL SALES

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	30	1071434.24	35714.47	33.70	<.0001
Error	29969	31757060.64	1059.66		
Corrected Total	29999	32828494.88			

R-Square	Coeff Var	Root MSE	RETAIL SALES Mean
0.032637	469.0696	32.55248	6.939796

Source	DF	Anova SS	Mean Square	F Value	Pr > F
Season	3	43917.8307	14639.2769	13.82	<.0001
ITEM TYPE	7	919322.4704	131331.7815	123.94	<.0001
Season*ITEM TYPE	20	108193.9429	5409.6971	5.11	<.0001

Two-Way ANOVA for Seasonal Trends and Product Categories

The ANOVA Procedure

Distribution of RETAIL SALES

23268	23528	25478	27420	15236	12370	10185	11651
23844	23542	25031	27188	21490	20471	135	10987
24130	23917	28713	25735	21786	22828	10725	2398
24299	23568	28127	25774	14419	21634	8174	6909
23992	23714	29145	24813	12263	22409	1956	7151
23884	24234	26757	24669	22804	21618	1886	9223
24205	23493	26503	24708	12472	17273	8285	9780
23589	23909	28276	24438	20200	17717	10680	7701
24271	23585	25345	24916	22593	19572	4497	8110
23681	23726	26296	26455	19026	18244	6753	9875
23721	23715	29224	27595	20939	23117	23	10866
24047	23719	28367	26772	12006	18097	9440	644
23216	24220	26563	28349	17907	19194	11134	9971
23478	23545	27336	26367	18958	14329	6727	369
24314	23537	24990	24777	16292	23047	3365	7955
23620	24041	25759	25294	15662	22435	10708	11401
23403	24454	27926	29602	21327	20394	8958	11289
24225	24116	24807	25291	21149	14434	570	5290
23473	23547	29418	26397	17845	22301	2727	1370
23766	24256	29253	25422	22008	22684	10094	6283
23906	23449	27744	24738	22205	21574	9792	10942
24044	23808	25192	29722	18299	20944	4309	2782
24218	24328	26122	28784	14700	20987	7451	10074
24016	23468	29412	29712	21417	22453	9514	7042
23694	23717	29334	28712	22412	20407	7544	10608
24227	23283	27165	24426	21380	22836	6577	3452
24210	23445	27981	26046	19454	18612	7521	6409
23651	24174	24086	24979	17542	13910	8897	10531

RETAIL SALES — Season: Fall, Spring, Summer, Winter

Two-Way ANOVA for Seasonal Trends and Product Categories

The ANOVA Procedure

Tukey's Studentized Range (HSD) Test for RETAIL SALES

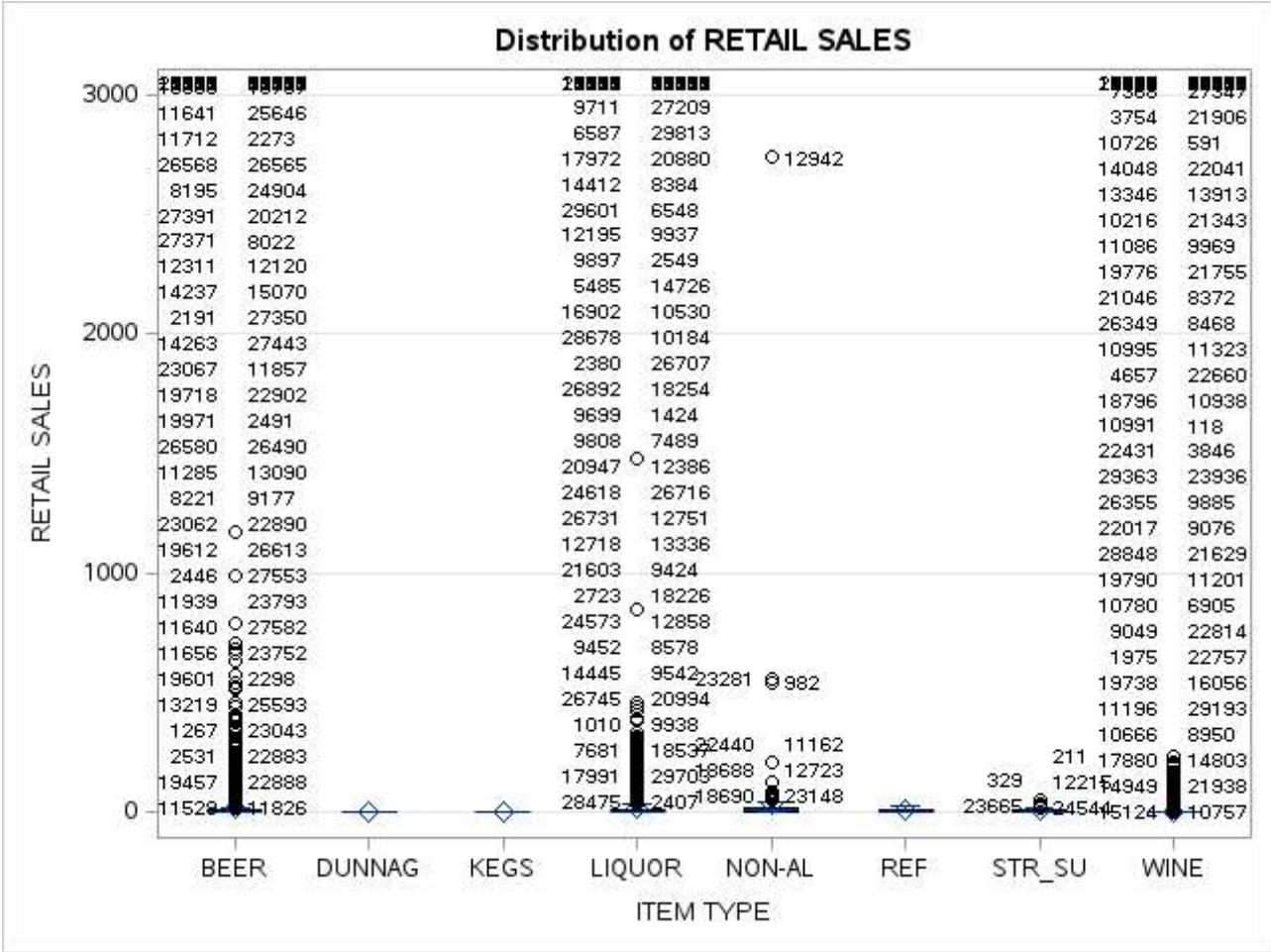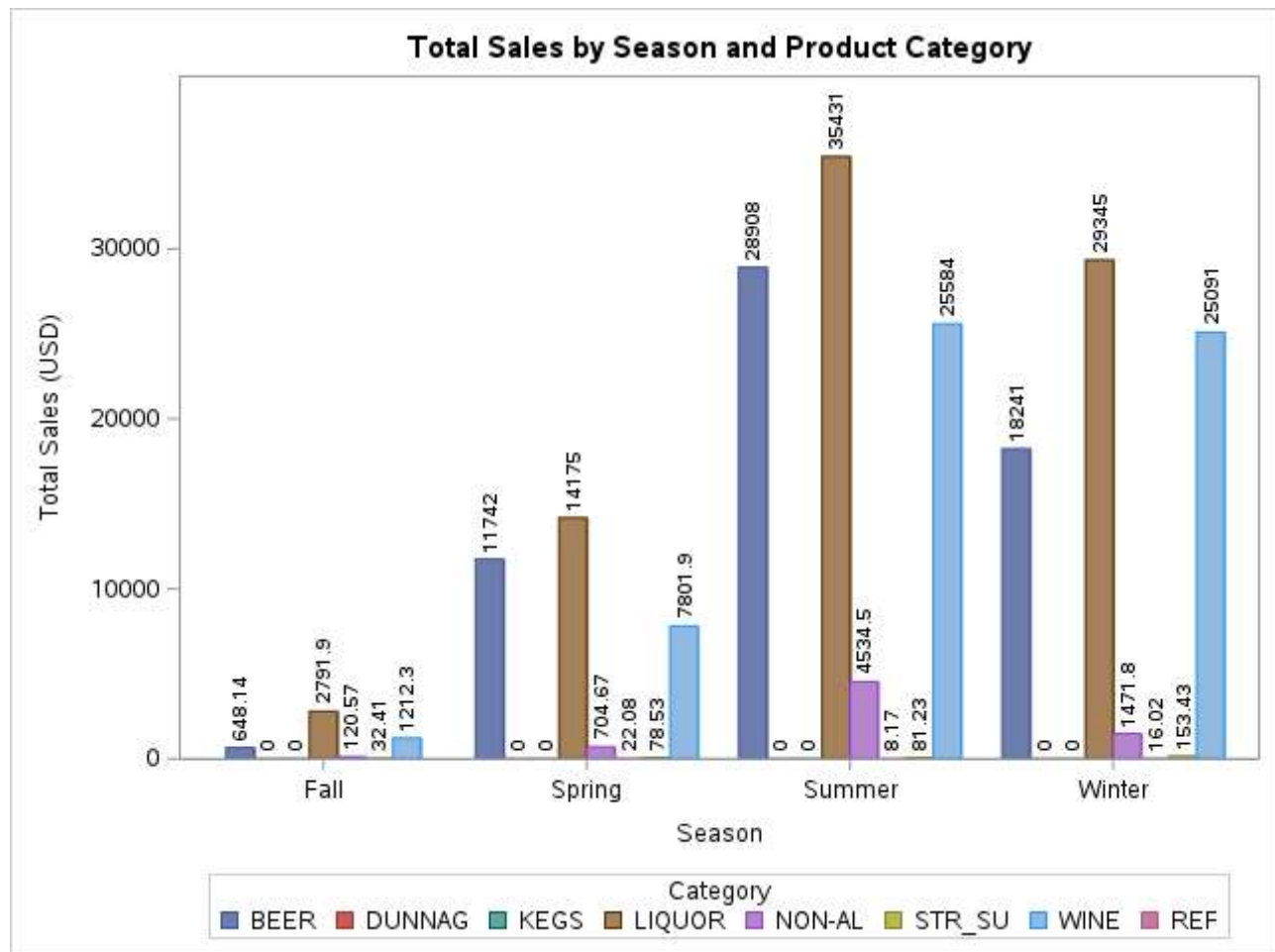**Note:** This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	29969
Error Mean Square	1059.664
Critical Value of Studentized Range	3.63335

Comparisons significant at the 0.05 level are indicated by ***.				
Season Comparison	**Difference Between Means**	**Simultaneous 95% Confidence Limits**		
Summer - Winter	2.2492	1.1498	3.3485	***
Summer - Spring	2.4240	1.0655	3.7826	***
Summer - Fall	4.0527	1.4024	6.7031	***
Winter - Summer	-2.2492	-3.3485	-1.1498	***
Winter - Spring	0.1748	-1.1684	1.5180	
Winter - Fall	1.8035	-0.8390	4.4460	
Spring - Summer	-2.4240	-3.7826	-1.0655	***
Spring - Winter	-0.1748	-1.5180	1.1684	
Spring - Fall	1.6287	-1.1318	4.3891	
Fall - Summer	-4.0527	-6.7031	-1.4024	***

		Comparisons significant at the 0.05 level are indicated by ***.	
Season Comparison	Difference Between Means	Simultaneous 95% Confidence Limits	
Fall - Winter	-1.8035	-4.4460	0.8390
Fall - Spring	-1.6287	-4.3891	1.1318

Two-Way ANOVA for Seasonal Trends and Product Categories

The ANOVA Procedure

Distribution of RETAIL SALES

Two-Way ANOVA for Seasonal Trends and Product Categories

The ANOVA Procedure
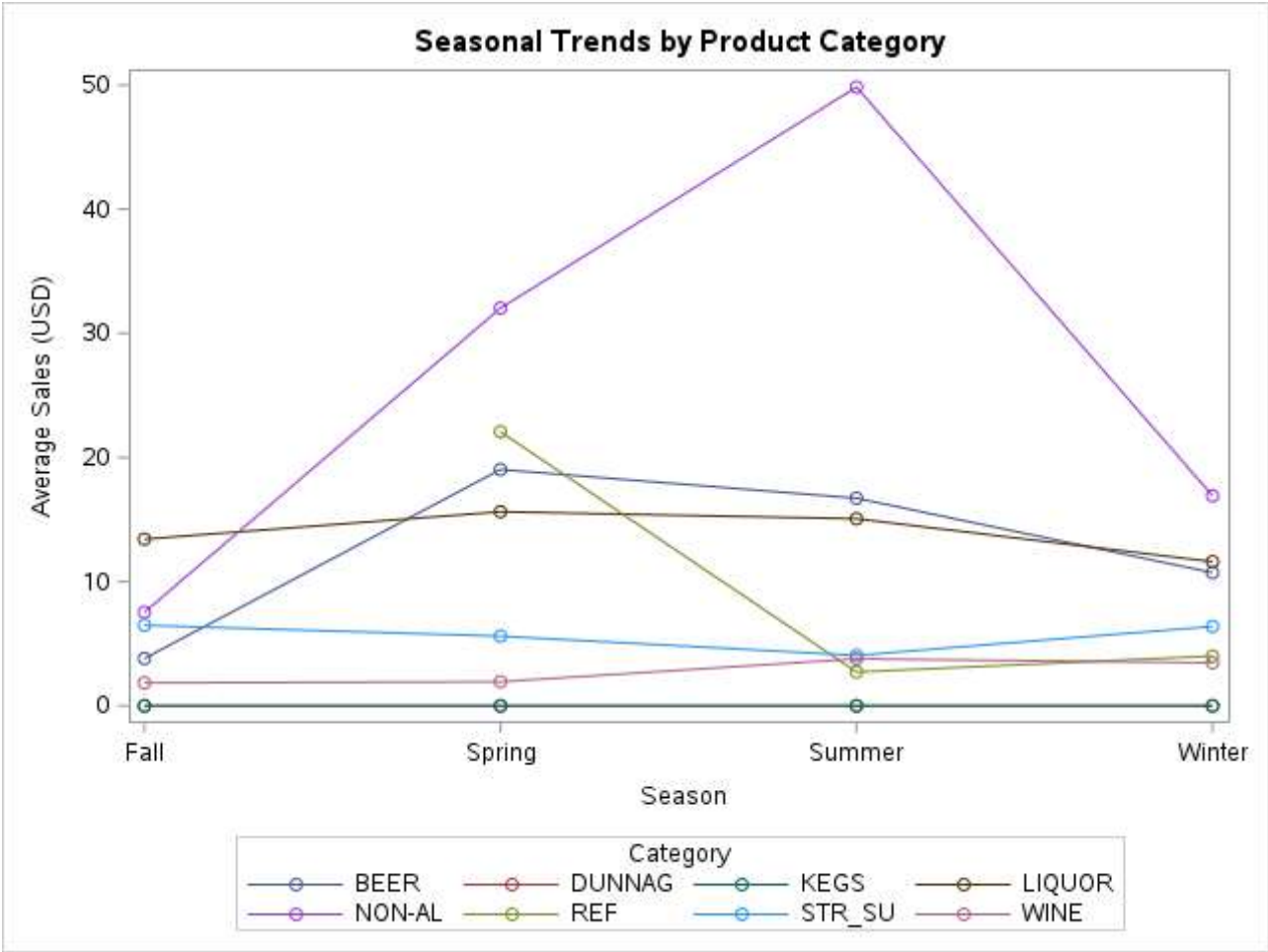
Tukey's Studentized Range (HSD) Test for RETAIL SALES

Note: This test controls the Type I experimentwise error rate.

Alpha	0.05
Error Degrees of Freedom	29969
Error Mean Square	1059.664
Critical Value of Studentized Range	4.28661

ITEM TYPE Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
Comparisons significant at the 0.05 level are indicated by *.**				
NON-AL - BEER	17.5088	10.6254	24.3923	***
NON-AL - LIQUOR	17.9924	11.1589	24.8259	***
NON-AL - REF	25.8438	-9.6813	61.3690	
NON-AL - STR_SU	26.1419	12.0136	40.2701	***
NON-AL - WINE	28.4323	21.6799	35.1846	***
NON-AL - KEGS	31.6276	24.0697	39.1855	***
NON-AL - DUNNAG	31.6276	3.4501	59.8051	***
BEER - NON-AL	-17.5088	-24.3923	-10.6254	***
BEER - LIQUOR	0.4836	-1.4995	2.4667	
BEER - REF	8.3350	-26.5831	43.2530	
BEER - STR_SU	8.6330	-3.8907	21.1568	
BEER - WINE	10.9234	9.2412	12.6056	***
BEER - KEGS	14.1187	10.3296	17.9079	***
BEER - DUNNAG	14.1187	-13.2894	41.5269	
LIQUOR - NON-AL	-17.9924	-24.8259	-11.1589	***
LIQUOR - BEER	-0.4836	-2.4667	1.4995	
LIQUOR - REF	7.8514	-27.0568	42.7597	
LIQUOR - STR_SU	8.1495	-4.3469	20.6458	
LIQUOR - WINE	10.4398	8.9752	11.9045	***
LIQUOR - KEGS	13.6352	9.9375	17.3329	***
LIQUOR - DUNNAG	13.6352	-13.7605	41.0309	
REF - NON-AL	-25.8438	-61.3690	9.6813	
REF - BEER	-8.3350	-43.2530	26.5831	
REF - LIQUOR	-7.8514	-42.7597	27.0568	
REF - STR_SU	0.2980	-36.7357	37.3318	
REF - WINE	2.5884	-32.3040	37.4809	
REF - KEGS	5.7838	-29.2735	40.8410	
REF - DUNNAG	5.7838	-38.5543	50.1218	
STR_SU - NON-AL	-26.1419	-40.2701	-12.0136	***
STR_SU - BEER	-8.6330	-21.1568	3.8907	
STR_SU - LIQUOR	-8.1495	-20.6458	4.3469	
STR_SU - REF	-0.2980	-37.3318	36.7357	
STR_SU - WINE	2.2904	-10.1618	14.7425	
STR_SU - KEGS	5.4857	-7.4210	18.3925	
STR_SU - DUNNAG	5.4857	-24.5715	35.5429	
WINE - NON-AL	-28.4323	-35.1846	-21.6799	***
WINE - BEER	-10.9234	-12.6056	-9.2412	***
WINE - LIQUOR	-10.4398	-11.9045	-8.9752	***
WINE - REF	-2.5884	-37.4809	32.3040	
WINE - STR_SU	-2.2904	-14.7425	10.1618	
WINE - KEGS	3.1953	-0.3501	6.7408	
WINE - DUNNAG	3.1953	-24.1802	30.5709	
KEGS - NON-AL	-31.6276	-39.1855	-24.0697	***
KEGS - BEER	-14.1187	-17.9079	-10.3296	***
KEGS - LIQUOR	-13.6352	-17.3329	-9.9375	***
KEGS - REF	-5.7838	-40.8410	29.2735	
KEGS - STR_SU	-5.4857	-18.3925	7.4210	

Comparisons significant at the 0.05 level are indicated by ***.				
ITEM TYPE Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
KEGS - WINE	-3.1953	-6.7408	0.3501	
KEGS - DUNNAG	0.0000	-27.5853	27.5853	
DUNNAG - NON-AL	-31.6276	-59.8051	-3.4501	***
DUNNAG - BEER	-14.1187	-41.5269	13.2894	
DUNNAG - LIQUOR	-13.6352	-41.0309	13.7605	
DUNNAG - REF	-5.7838	-50.1218	38.5543	
DUNNAG - STR_SU	-5.4857	-35.5429	24.5715	
DUNNAG - WINE	-3.1953	-30.5709	24.1802	
DUNNAG - KEGS	0.0000	-27.5853	27.5853	

Total Sales by Season and Product Category

Seasonal Trends by Product Category

Verify Recoded Dataset

The CONTENTS Procedure

Data Set Name	WORK.SALES_CATEGORIZED_NUMERIC	**Observations**	30000
Member Type	DATA	**Variables**	13
Engine	V9	**Indexes**	0
Created	02/05/2025 19:05:34	**Observation Length**	176
Last Modified	02/05/2025 19:05:34	**Deleted Observations**	0
Protection		**Compressed**	NO
Data Set Type		**Sorted**	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Engine/Host Dependent Information	
Data Set Page Size	131072
Number of Data Set Pages	41
First Data Page	1
Max Obs per Page	743
Obs in First Data Page	724
Number of Data Set Repairs	0
Filename	/saswork/SAS_workF30C0000B621_odaws02-usw2-2.oda.sas.com/SAS_workC4230000B621_odaws02-usw2-2.oda.sas.com/sales_categorized_numeric.sas7bdat

Engine/Host Dependent Information	
Release Created	9.0401M7
Host Created	Linux
Inode Number	939528434
Access Permission	rw-r--r--
Owner Name	u63632109
File Size	5MB
File Size (bytes)	5505024

Alphabetic List of Variables and Attributes					
#	**Variable**	**Type**	**Len**	**Format**	**Informat**
4	ITEM CODE	Num	8	BEST12.	BEST32.
5	ITEM DESCRIPTION	Char	55	$55.	$55.
6	ITEM TYPE	Char	6	$6.	$6.
2	MONTH	Num	8	BEST12.	BEST32.
7	RETAIL SALES	Num	8	BEST12.	BEST32.
8	RETAIL TRANSFERS	Num	8	BEST12.	BEST32.
11	SKU	Num	8		
10	SKU_Code	Num	8		
3	SUPPLIER	Char	38	$38.	$38.
12	Sales_Category	Char	3		
13	Sales_Code	Num	8		
9	WAREHOUSE SALES	Num	8	BEST12.	BEST32.
1	YEAR	Num	8	BEST12.	BEST32.

Monthly Retail Sales Trends