

MANOVA

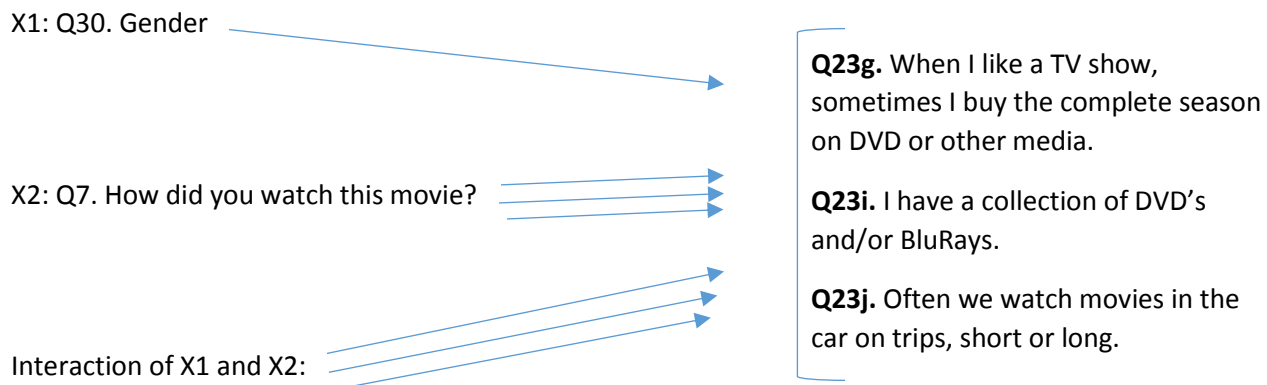
COM 631

Dr. Kim Neuendorf

Danny Raffoul

I. MODEL

From Film and TV data set (Neuendorf et al.)



Independent Variables:

Q7. How did you watch this movie 1?

Nominal (4 Categories)

1 = In a theater, 2 = On TV/cable, 3= DVD/Blu-ray, 4 = Online

Q30. Gender

Nominal (2 Categories)

1= Male, 2= Female

Dependent Variables (all correlated with each other significantly):

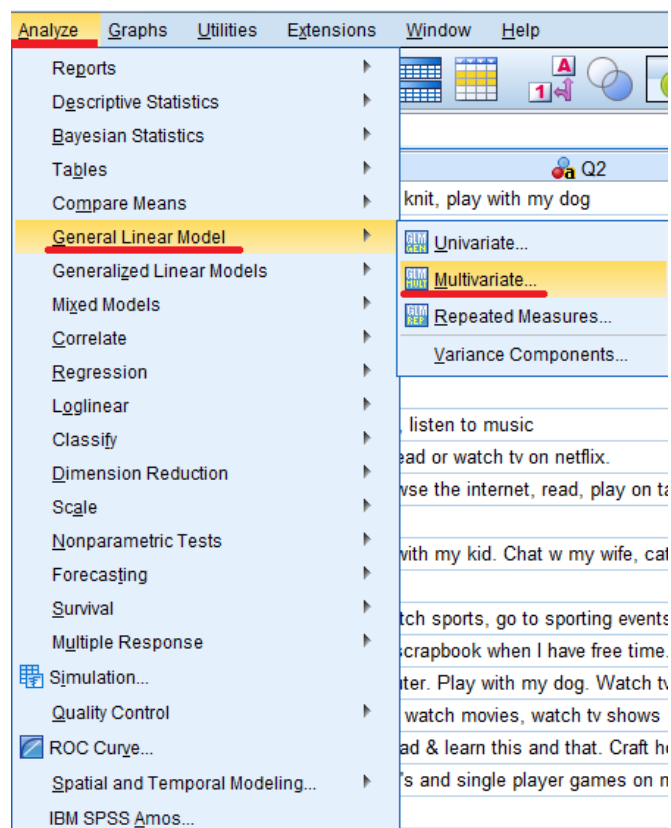
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.

Q23i. I have a collection of DVDs and/or BluRays.

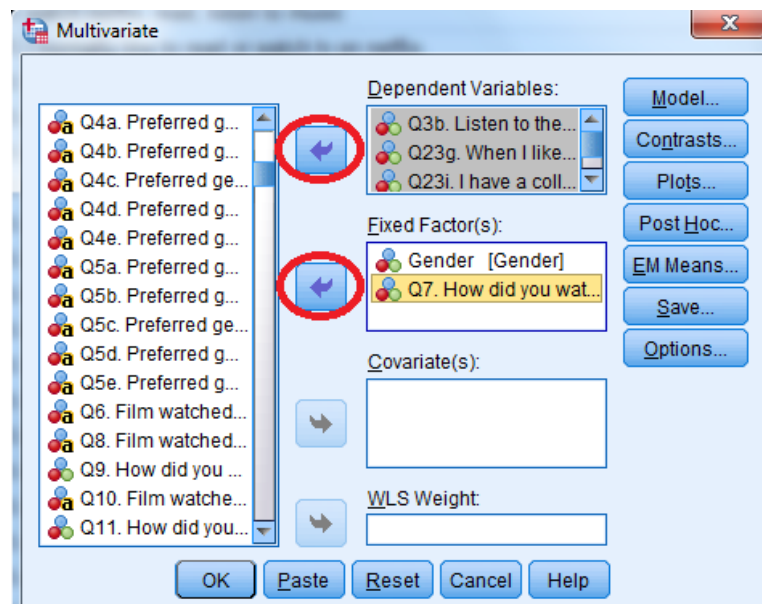
Q23j. Often we watch movies in the car on trips, short or long.

II. RUNNING SPSS

Analyze > General Linear Model > Multivariate



Pull from box on left hand side and drop into right hand side in order to add 'Dependent Variables' and Fixed Factors (Independent Variables) by selecting the arrow icons.



Select 'Model' > Full Factorial > click Continue

Multivariate: Model

Specify Model: Full factorial Build terms Build custom terms

Factors & Covariates: Gender, Q7

Model:

Build Term(s): Type: Interaction

Sum of squares: Type III Include intercept in model

Buttons: Continue, Cancel, Help

Select 'Plots' > Move items from left hand side into Horizontal Axis & Separate Lines accordingly > click add to create graph displaying interaction > click continue

Multivariate: Profile Plots

Factors: Gender, Q7

Horizontal Axis: Gender

Separate Lines: Q7

Separate Plots:

Plots: Add Change Remove

Gender*Q7

Chart Type: Line Chart Bar Chart

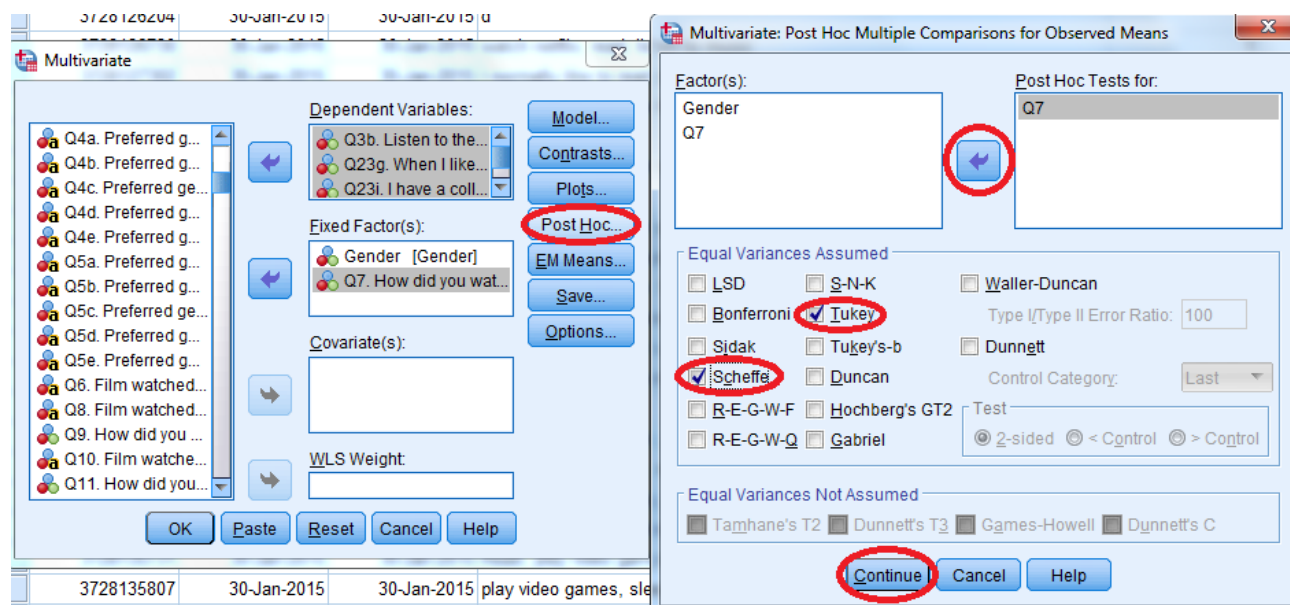
Error Bars: Include Error bars

Confidence Interval (95.0%) Standard Error Multiplier: 2

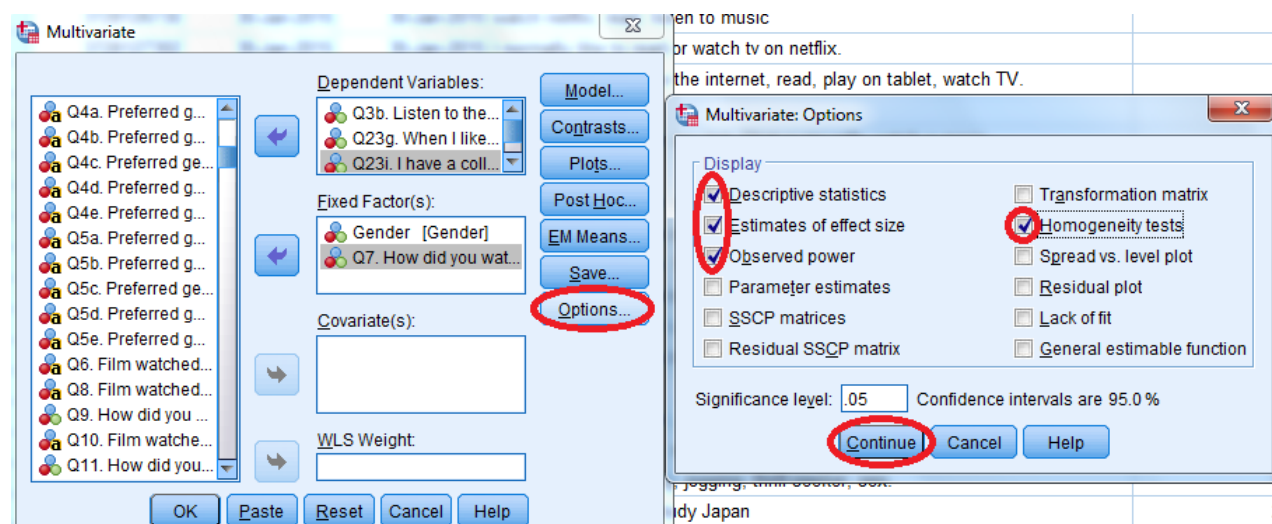
Include reference line for grand mean Y axis starts at 0

Buttons: Continue, Cancel, Help

Select Post Hoc > Using arrow key move IV from left to right > Under 'Equal Variances Assumed', select Scheffe and Tukey's-b > click continue

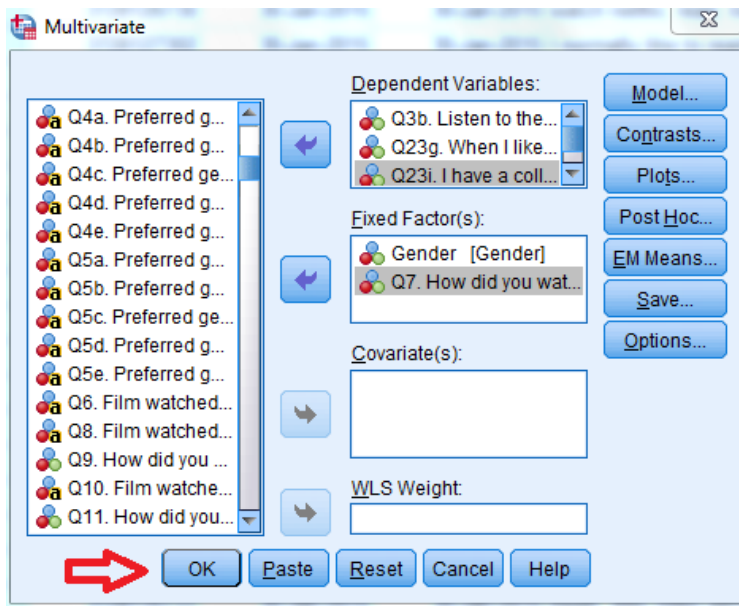


Select Options > Under 'Display', select Descriptive statistics, Estimates of effect size, Observed power and Homogeneity tests > click continue

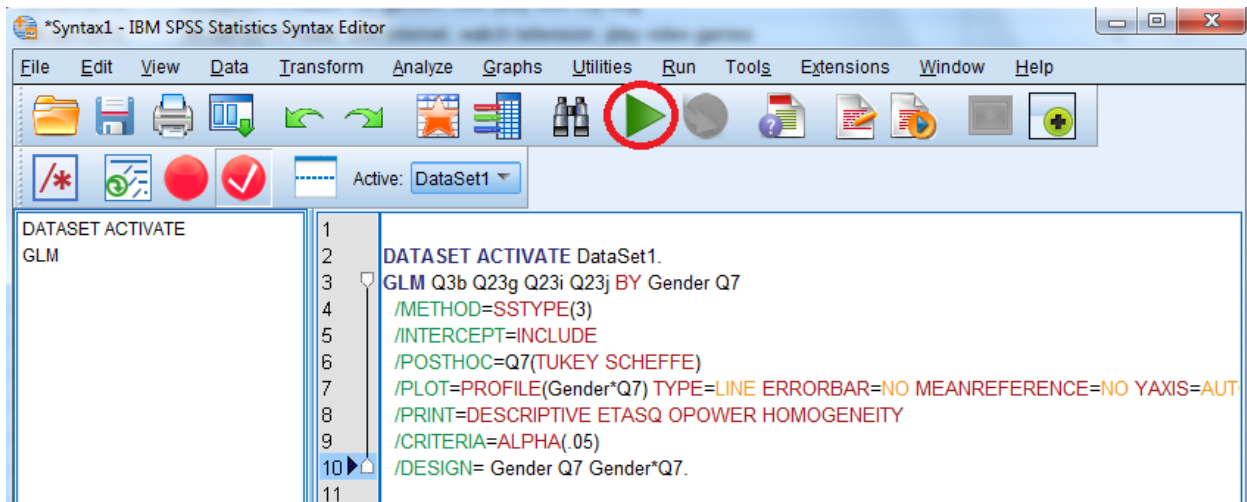


NOTE: The version of SPSS used to produce these analyses did not have an Options section for "Estimated Marginal Means," yet the output to follow does present these figures. Your version may have that section, and require you to click over, from left to right, your variables in order to get estimated marginal means in your output.

Once all is complete, click 'OK' to run MANOVA or select 'Paste' to save Syntax and then click the run icon



OR



III. SPSS Output

```

CORRELATIONS
/VARIABLES=Q23g Q23i Q23j
/PRINT=TWOTAIL NOSIG
/MISSING=PAIRWISE.

```

Correlations

		Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	Q23i. I have a collection of DVDs and/or BluRays.	Q23j. Often we watch movies in the car on trips, short or long.
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	Pearson Correlation	1	.652**	.208**
	Sig. (2-tailed)		.000	.000
	N	367	367	367
Q23i. I have a collection of DVDs and/or BluRays.	Pearson Correlation	.652**	1	.221**
	Sig. (2-tailed)	.000		.000
	N	367	367	367
Q23j. Often we watch movies in the car on trips, short or long.	Pearson Correlation	.208**	.221**	1
	Sig. (2-tailed)	.000	.000	
	N	367	367	367

** . Correlation is significant at the 0.01 level (2-tailed).

```

GLM Q23g Q23i Q23j BY Gender Q7
/METHOD=SSTYPE(3)
/INTERCEPT=INCLUDE
/POSTHOC=Q7(TUKEY SCHEFFE)
/PLOT=PROFILE(Gender*Q7 Q7*Gender)
/EMMEANS=TABLES(Gender)
/EMMEANS=TABLES(Q7)
/EMMEANS=TABLES(Gender*Q7)
/PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY
/CRITERIA=ALPHA(.05)
/DESIGN= Gender Q7 Gender*Q7.

```

General Linear Model

Notes

Output Created		22-APR-2019 18:45:10
Comments		
Input	Data	C:\Users\1002678\Downloads\filmtv15data (15).sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	543
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.
Syntax		<pre> GLM Q23g Q23i Q23j BY Gender Q7 /METHOD=SSTYPE(3) /INTERCEPT=INCLUDE /POSTHOC=Q7(TUKEY SCHEFFE) /PLOT=PROFILE(Gender*Q 7 Q7*Gender) /EMMEANS=TABLES(Gende r) /EMMEANS=TABLES(Q7) /EMMEANS=TABLES(Gende r*Q7) /PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY /CRITERIA=ALPHA(.05) /DESIGN= Gender Q7 Gender*Q7. </pre>
Resources	Processor Time	00:00:00.59
	Elapsed Time	00:00:00.56

Between-Subjects Factors

		Value Label	N
Gender	1	1-Male	141
	2	2-Female	222
Q7. How did you watch this movie 1	1	1-In theater	85
	2	2-On TV/cable	84
	3	3-DVD or BluRay	90
	4	4-Online	104

Descriptive Statistics

	Gender	Q7. How did you watch this movie 1	Mean	Std. Deviation	N
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	1-Male	1-In theater	3.52	2.098	42
		2-On TV/cable	4.42	2.317	19
		3-DVD or BluRay	4.27	2.140	33
		4-Online	2.94	2.068	47
		Total	3.62	2.186	141
	2-Female	1-In theater	3.65	2.181	43
		2-On TV/cable	2.98	2.211	65
		3-DVD or BluRay	4.18	2.376	57
		4-Online	3.07	2.034	57
		Total	3.44	2.246	222
	Total	1-In theater	3.59	2.129	85
		2-On TV/cable	3.31	2.302	84
		3-DVD or BluRay	4.21	2.281	90
		4-Online	3.01	2.041	104
		Total	3.51	2.222	363
Q23i. I have a collection of DVDs and/or BluRays.	1-Male	1-In theater	3.95	2.071	42
		2-On TV/cable	5.05	1.985	19
		3-DVD or BluRay	4.94	1.968	33

		4-Online	3.62	2.038	47
		Total	4.22	2.091	141
	2-Female	1-In theater	4.05	2.193	43
		2-On TV/cable	4.25	2.305	65
		3-DVD or BluRay	5.09	2.090	57
		4-Online	4.26	2.224	57
		Total	4.43	2.229	222
	Total	1-In theater	4.00	2.121	85
		2-On TV/cable	4.43	2.251	84
		3-DVD or BluRay	5.03	2.036	90
		4-Online	3.97	2.156	104
		Total	4.35	2.176	363
Q23j. Often we watch movies in the car on trips, short or long.	1-Male	1-In theater	2.90	1.948	42
		2-On TV/cable	2.47	1.837	19
		3-DVD or BluRay	2.58	1.871	33
		4-Online	2.28	1.664	47
		Total	2.56	1.822	141
	2-Female	1-In theater	2.79	2.122	43
		2-On TV/cable	2.29	1.958	65
		3-DVD or BluRay	2.56	2.009	57
		4-Online	2.72	1.971	57
		Total	2.57	2.003	222
	Total	1-In theater	2.85	2.027	85
		2-On TV/cable	2.33	1.922	84
		3-DVD or BluRay	2.57	1.949	90
		4-Online	2.52	1.843	104
		Total	2.56	1.932	363

**Box's Test of Equality
of Covariance
Matrices^a**

Box's M	42.222
F	.973
df1	42
df2	79218.693
Sig.	.521

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.^a

a. Design: Intercept + Gender + Q7 + Gender * Q7

Multivariate Tests^a

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.822	542.243 ^b	3.000	353.000	.000	.822
	Wilks' Lambda	.178	542.243 ^b	3.000	353.000	.000	.822
	Hotelling's Trace	4.608	542.243 ^b	3.000	353.000	.000	.822
	Roy's Largest Root	4.608	542.243 ^b	3.000	353.000	.000	.822
Gender	Pillai's Trace	.009	1.056 ^b	3.000	353.000	.368	.009
	Wilks' Lambda	.991	1.056 ^b	3.000	353.000	.368	.009
	Hotelling's Trace	.009	1.056 ^b	3.000	353.000	.368	.009
	Roy's Largest Root	.009	1.056 ^b	3.000	353.000	.368	.009
Q7	Pillai's Trace	.070	2.847	9.000	1065.000	.003	.023
	Wilks' Lambda	.931	2.868	9.000	859.260	.002	.024
	Hotelling's Trace	.074	2.877	9.000	1055.000	.002	.024
	Roy's Largest Root	.054	6.400 ^c	3.000	355.000	.000	.051
Gender * Q7	Pillai's Trace	.023	.907	9.000	1065.000	.519	.008
	Wilks' Lambda	.977	.905	9.000	859.260	.520	.008
	Hotelling's Trace	.023	.904	9.000	1055.000	.521	.008
	Roy's Largest Root	.017	2.050 ^c	3.000	355.000	.107	.017

Multivariate Tests^a

Effect		Noncent. Parameter	Observed Power ^d
Intercept	Pillai's Trace	1626.729	1.000
	Wilks' Lambda	1626.729	1.000
	Hotelling's Trace	1626.729	1.000
	Roy's Largest Root	1626.729	1.000
Gender	Pillai's Trace	3.169	.286
	Wilks' Lambda	3.169	.286
	Hotelling's Trace	3.169	.286
	Roy's Largest Root	3.169	.286
Q7	Pillai's Trace	25.623	.965
	Wilks' Lambda	20.880	.914
	Hotelling's Trace	25.891	.967
	Roy's Largest Root	19.199	.968
Gender * Q7	Pillai's Trace	8.159	.460
	Wilks' Lambda	6.605	.370
	Hotelling's Trace	8.136	.459
	Roy's Largest Root	6.149	.524

a. Design: Intercept + Gender + Q7 + Gender * Q7

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

d. Computed using alpha = .05

Levene's Test of Equality of Error Variances^a

	F	df1	df2	Sig.
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	.781	7	355	.604
Q23i. I have a collection of DVDs and/or BluRays.	.807	7	355	.582
Q23j. Often we watch movies in the car on trips, short or long.	1.289	7	355	.255

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.^a

a. Design: Intercept + Gender + Q7 + Gender * Q7

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^d
Corrected Model	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	105.516 ^a	7	15.074	3.183	.003	.059	22.281	.950
	Q23i. I have a collection of DVDs and/or BluRays.	88.845 ^b	7	12.692	2.772	.008	.052	19.404	.913
	Q23j. Often we watch movies in the car on trips, short or long.	17.302 ^c	7	2.472	.658	.708	.013	4.605	.284
Intercept	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	4178.660	1	4178.660	882.372	.000	.713	882.372	1.000
	Q23i. I have a collection of DVDs and/or BluRays.	6143.231	1	6143.231	1341.713	.000	.791	1341.713	1.000
	Q23j. Often we watch movies in the car on trips, short or long.	2102.285	1	2102.285	559.484	.000	.612	559.484	1.000
Gender	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	8.024	1	8.024	1.694	.194	.005	1.694	.255
	Q23i. I have a collection of DVDs and/or BluRays.	.033	1	.033	.007	.932	.000	.007	.051
	Q23j. Often we watch movies in the car on trips, short or long.	.088	1	.088	.023	.879	.000	.023	.053

Q7	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	69.841	3	23.280	4.916	.002	.040	14.748	.909
	Q23i. I have a collection of DVDs and/or BluRays.	69.835	3	23.278	5.084	.002	.041	15.252	.919
	Q23j. Often we watch movies in the car on trips, short or long.	9.070	3	3.023	.805	.492	.007	2.414	.224
Gender * Q7	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	27.845	3	9.282	1.960	.120	.016	5.880	.504
	Q23i. I have a collection of DVDs and/or BluRays.	19.782	3	6.594	1.440	.231	.012	4.320	.381
	Q23j. Often we watch movies in the car on trips, short or long.	5.375	3	1.792	.477	.699	.004	1.430	.146
Error	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	1681.179	355	4.736					
	Q23i. I have a collection of DVDs and/or BluRays.	1625.420	355	4.579					
	Q23j. Often we watch movies in the car on trips, short or long.	1333.927	355	3.758					
Total	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	6265.000	363						
	Q23i. I have a collection of DVDs and/or BluRays.	8574.000	363						

	Q23j. Often we watch movies in the car on trips, short or long.	3739.00 0	363						
Corrected Total	Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	1786.69 4	362						
	Q23i. I have a collection of DVDs and/or BluRays.	1714.26 4	362						
	Q23j. Often we watch movies in the car on trips, short or long.	1351.22 9	362						

- a. R Squared = .059 (Adjusted R Squared = .041)
- b. R Squared = .052 (Adjusted R Squared = .033)
- c. R Squared = .013 (Adjusted R Squared = -.007)
- d. Computed using alpha = .05

Estimated Marginal Means

1. Gender

Dependent Variable	Gender	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	1-Male	3.788	.195	3.406	4.171
	2-Female	3.470	.148	3.180	3.761
Q23i. I have a collection of DVDs and/or BluRays.	1-Male	4.390	.191	4.014	4.767
	2-Female	4.411	.145	4.125	4.697
Q23j. Often we watch movies in the car on trips, short or long.	1-Male	2.558	.173	2.217	2.899
	2-Female	2.591	.132	2.332	2.850

2. Q7. How did you watch this movie 1

Dependent Variable	Q7. How did you watch this movie 1	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	1-In theater	3.587	.236	3.123	4.052
	2-On TV/cable	3.703	.284	3.145	4.261
	3-DVD or BluRay	4.224	.238	3.756	4.692
	4-Online	3.003	.214	2.582	3.425
Q23i. I have a collection of DVDs and/or BluRays.	1-In theater	3.999	.232	3.543	4.456
	2-On TV/cable	4.649	.279	4.101	5.198
	3-DVD or BluRay	5.014	.234	4.553	5.474
	4-Online	3.940	.211	3.526	4.355
Q23j. Often we watch movies in the car on trips, short or long.	1-In theater	2.848	.210	2.434	3.261
	2-On TV/cable	2.383	.253	1.886	2.880
	3-DVD or BluRay	2.569	.212	2.152	2.986
	4-Online	2.498	.191	2.122	2.874

3. Gender * Q7. How did you watch this movie 1

Dependent Variable	Gender	Q7. How did you watch this movie 1	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	1-Male	1-In theater	3.524	.336	2.863	4.184
		2-On TV/cable	4.421	.499	3.439	5.403
		3-DVD or BluRay	4.273	.379	3.528	5.018
		4-Online	2.936	.317	2.312	3.560
	2-Female	1-In theater	3.651	.332	2.998	4.304
		2-On TV/cable	2.985	.270	2.454	3.515
		3-DVD or BluRay	4.175	.288	3.609	4.742
		4-Online	3.070	.288	2.503	3.637
Q23i. I have a collection of DVDs and/or BluRays.	1-Male	1-In theater	3.952	.330	3.303	4.602
		2-On TV/cable	5.053	.491	4.087	6.018
		3-DVD or BluRay	4.939	.372	4.207	5.672
		4-Online	3.617	.312	3.003	4.231
	2-Female	1-In theater	4.047	.326	3.405	4.688
		2-On TV/cable	4.246	.265	3.724	4.768
		3-DVD or BluRay	5.088	.283	4.530	5.645
		4-Online	4.263	.283	3.706	4.821
Q23j. Often we watch movies in the car on trips, short or long.	1-Male	1-In theater	2.905	.299	2.317	3.493
		2-On TV/cable	2.474	.445	1.599	3.348
		3-DVD or BluRay	2.576	.337	1.912	3.239
		4-Online	2.277	.283	1.721	2.833
	2-Female	1-In theater	2.791	.296	2.209	3.372
		2-On TV/cable	2.292	.240	1.819	2.765
		3-DVD or BluRay	2.561	.257	2.056	3.066
		4-Online	2.719	.257	2.214	3.224

Post Hoc Tests

Q7. How did you watch this movie 1

Multiple Comparisons

Dependent Variable		(I) Q7. How did you watch this movie 1	(J) Q7. How did you watch this movie 1	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.	Tukey HSD	1-In theater	2-On TV/cable	.28	.335	.839	-.59	1.14
			3-DVD or BluRay	-.62	.329	.233	-1.47	.23
			4-Online	.58	.318	.266	-.24	1.40
		2-On TV/cable	1-In theater	-.28	.335	.839	-1.14	.59
			3-DVD or BluRay	-.90*	.330	.033	-1.75	-.05
			4-Online	.30	.319	.784	-.52	1.12
		3-DVD or BluRay	1-In theater	.62	.329	.233	-.23	1.47
			2-On TV/cable	.90*	.330	.033	.05	1.75
			4-Online	1.20*	.313	.001	.39	2.01
	4-Online	1-In theater	-.58	.318	.266	-1.40	.24	
		2-On TV/cable	-.30	.319	.784	-1.12	.52	
		3-DVD or BluRay	-1.20*	.313	.001	-2.01	-.39	
	Scheffe	1-In theater	2-On TV/cable	.28	.335	.875	-.66	1.22
			3-DVD or BluRay	-.62	.329	.312	-1.55	.30
			4-Online	.58	.318	.348	-.32	1.47
		2-On TV/cable	1-In theater	-.28	.335	.875	-1.22	.66
			3-DVD or BluRay	-.90	.330	.060	-1.83	.03
			4-Online	.30	.319	.830	-.60	1.20
3-DVD or BluRay		1-In theater	.62	.329	.312	-.30	1.55	
		2-On TV/cable	.90	.330	.060	-.03	1.83	
		4-Online	1.20*	.313	.002	.32	2.08	
4-Online	1-In theater	-.58	.318	.348	-1.47	.32		
	2-On TV/cable	-.30	.319	.830	-1.20	.60		

			3-DVD or BluRay		-1.20*	.313	.002	-2.08	-.32	
Q23i. I have a collection of DVDs and/or BluRays.	Tukey HSD	1-In theater	2-On TV/cable		-.43	.329	.562	-1.28	.42	
			3-DVD or BluRay		-1.03*	.324	.008	-1.87	-.20	
			4-Online		.03	.313	1.000	-.78	.84	
		2-On TV/cable	1-In theater		.43	.329	.562	-.42	1.28	
				3-DVD or BluRay		-.60	.325	.246	-1.44	.23
				4-Online		.46	.314	.465	-.35	1.27
		3-DVD or BluRay	1-In theater		1.03*	.324	.008	.20	1.87	
				2-On TV/cable		.60	.325	.246	-.23	1.44
				4-Online		1.06*	.308	.004	.27	1.86
		4-Online	1-In theater		-.03	.313	1.000	-.84	.78	
				2-On TV/cable		-.46	.314	.465	-1.27	.35
				3-DVD or BluRay		-1.06*	.308	.004	-1.86	-.27
	Scheffe	1-In theater	2-On TV/cable		-.43	.329	.638	-1.35	.50	
			3-DVD or BluRay		-1.03*	.324	.018	-1.94	-.12	
			4-Online		.03	.313	1.000	-.85	.91	
		2-On TV/cable	1-In theater		.43	.329	.638	-.50	1.35	
				3-DVD or BluRay		-.60	.325	.326	-1.52	.31
				4-Online		.46	.314	.548	-.42	1.34
		3-DVD or BluRay	1-In theater		1.03*	.324	.018	.12	1.94	
				2-On TV/cable		.60	.325	.326	-.31	1.52
				4-Online		1.06*	.308	.008	.20	1.93
	4-Online	1-In theater		-.03	.313	1.000	-.91	.85		
			2-On TV/cable		-.46	.314	.548	-1.34	.42	
			3-DVD or BluRay		-1.06*	.308	.008	-1.93	-.20	
Q23j. Often we watch movies in the car on trips, short or long.	Tukey HSD	1-In theater	2-On TV/cable		.51	.298	.313	-.26	1.28	
			3-DVD or BluRay		.28	.293	.774	-.48	1.04	
			4-Online		.33	.283	.655	-.40	1.06	
		2-On TV/cable	1-In theater		-.51	.298	.313	-1.28	.26	

		3-DVD or BluRay		-.23	.294	.857	-.99	.53
		4-Online		-.19	.284	.914	-.92	.55
	3-DVD or BluRay	1-In theater		-.28	.293	.774	-1.04	.48
		2-On TV/cable		.23	.294	.857	-.53	.99
		4-Online		.05	.279	.998	-.67	.77
	4-Online	1-In theater		-.33	.283	.655	-1.06	.40
		2-On TV/cable		.19	.284	.914	-.55	.92
		3-DVD or BluRay		-.05	.279	.998	-.77	.67
Scheffe	1-In theater	2-On TV/cable		.51	.298	.398	-.32	1.35
		3-DVD or BluRay		.28	.293	.822	-.54	1.10
		4-Online		.33	.283	.720	-.47	1.12
	2-On TV/cable	1-In theater		-.51	.298	.398	-1.35	.32
		3-DVD or BluRay		-.23	.294	.890	-1.06	.59
		4-Online		-.19	.284	.934	-.98	.61
	3-DVD or BluRay	1-In theater		-.28	.293	.822	-1.10	.54
		2-On TV/cable		.23	.294	.890	-.59	1.06
		4-Online		.05	.279	.999	-.74	.83
	4-Online	1-In theater		-.33	.283	.720	-1.12	.47
		2-On TV/cable		.19	.284	.934	-.61	.98
		3-DVD or BluRay		-.05	.279	.999	-.83	.74

Based on observed means.

The error term is Mean Square(Error) = 3.758.

*. The mean difference is significant at the .05 level.

Homogeneous Subsets

Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.

Q7. How did you watch this movie 1	N	Subset	
		1	2
Tukey HSD ^{a,b,c} 4-Online	104	3.01	
2-On TV/cable	84	3.31	
1-In theater	85	3.59	3.59
3-DVD or BluRay	90		4.21
Sig.		.282	.221
Scheffe ^{a,b,c} 4-Online	104	3.01	
2-On TV/cable	84	3.31	3.31
1-In theater	85	3.59	3.59
3-DVD or BluRay	90		4.21
Sig.		.365	.054

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 4.736.

a. Uses Harmonic Mean Sample Size = 90.098.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Q23i. I have a collection of DVDs and/or BluRays.

Q7. How did you watch this movie 1	N	Subset	
		1	2
Tukey HSD ^{a,b,c} 4-Online	104	3.97	
1-In theater	85	4.00	
2-On TV/cable	84	4.43	4.43
3-DVD or BluRay	90		5.03

	Sig.		.478	.231
Scheffe ^{a,b,c}	4-Online	104	3.97	
	1-In theater	85	4.00	
	2-On TV/cable	84	4.43	4.43
	3-DVD or BluRay	90		5.03
	Sig.		.561	.310

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 4.579.

a. Uses Harmonic Mean Sample Size = 90.098.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

c. Alpha = .05.

Q23j. Often we watch movies in the car on trips, short or long.

Q7. How did you watch this movie 1	N	Subset	
		1	
Tukey HSD ^{a,b,c}	2-On TV/cable	84	2.33
	4-Online	104	2.52
	3-DVD or BluRay	90	2.57
	1-In theater	85	2.85
	Sig.		.285
Scheffe ^{a,b,c}	2-On TV/cable	84	2.33
	4-Online	104	2.52
	3-DVD or BluRay	90	2.57
	1-In theater	85	2.85
	Sig.		.368

Means for groups in homogeneous subsets are displayed.

Based on observed means.

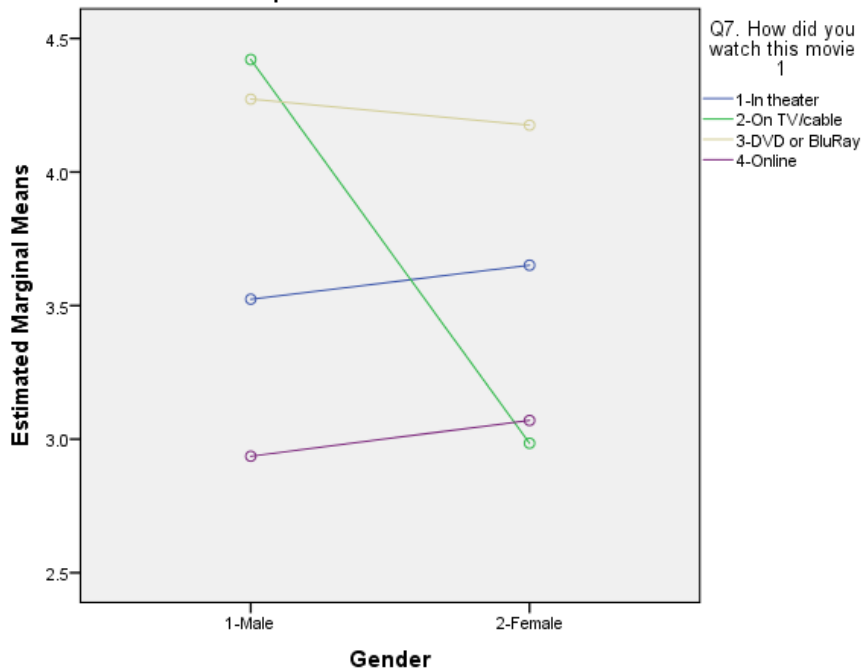
The error term is Mean Square(Error) = 3.758.

- a. Uses Harmonic Mean Sample Size = 90.098.
- b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.
- c. Alpha = .05.

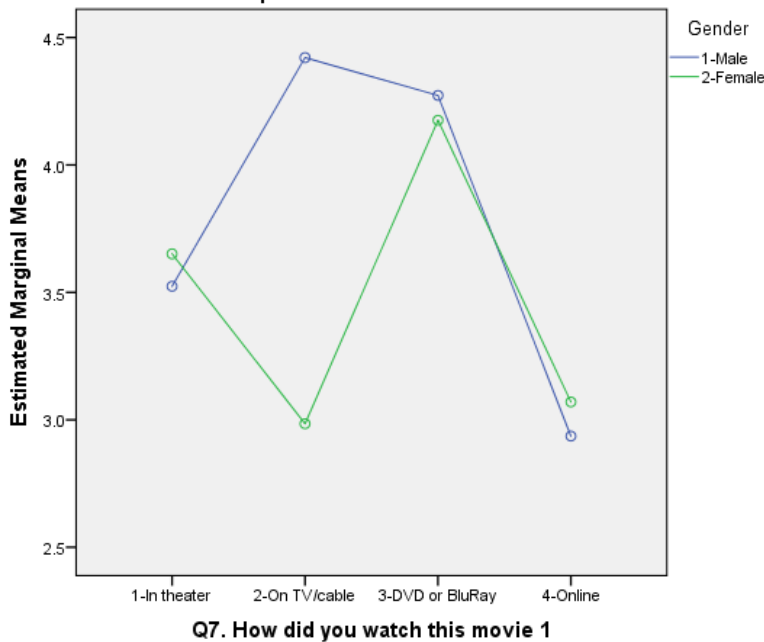
Profile Plots

Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.

Estimated Marginal Means of Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.

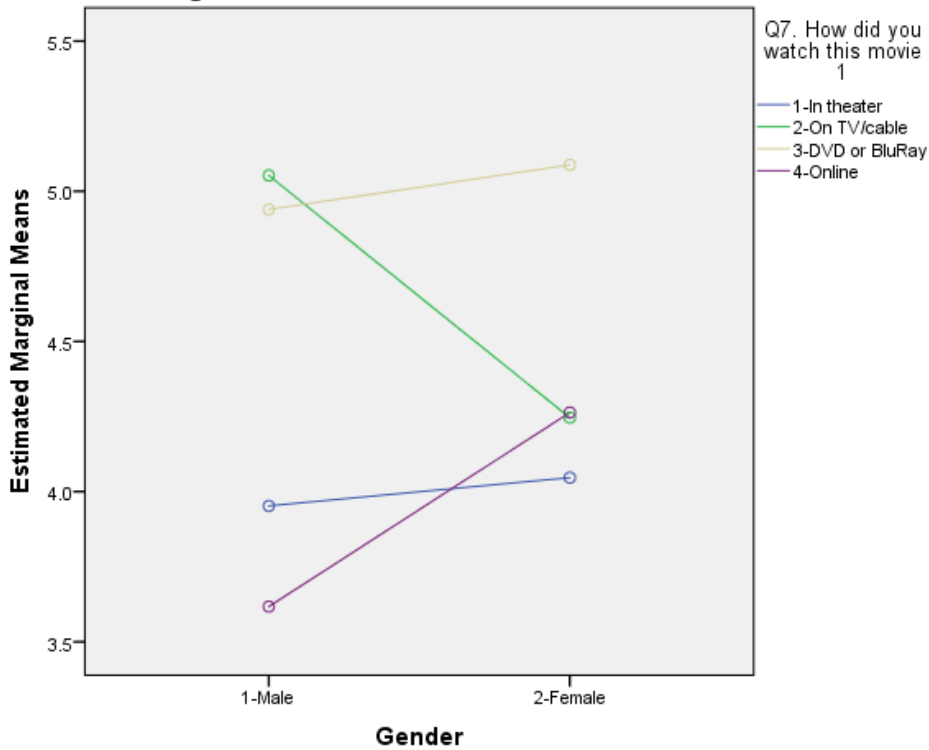


Estimated Marginal Means of Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.

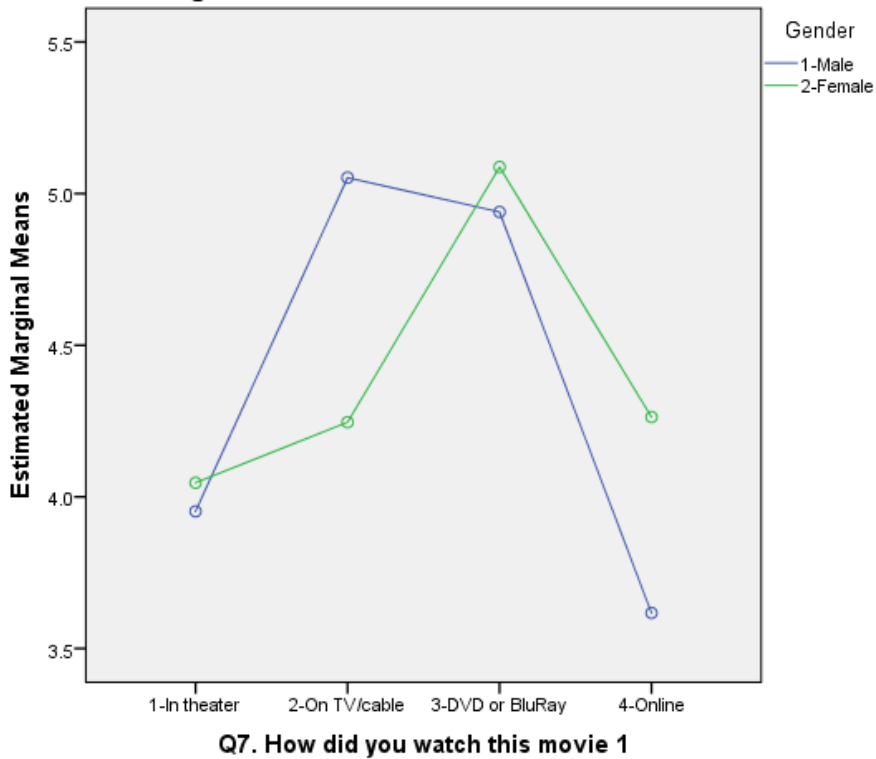


Q23i. I have a collection of DVDs and/or BluRays.

Estimated Marginal Means of Q23i. I have a collection of DVDs and/or BluRays.

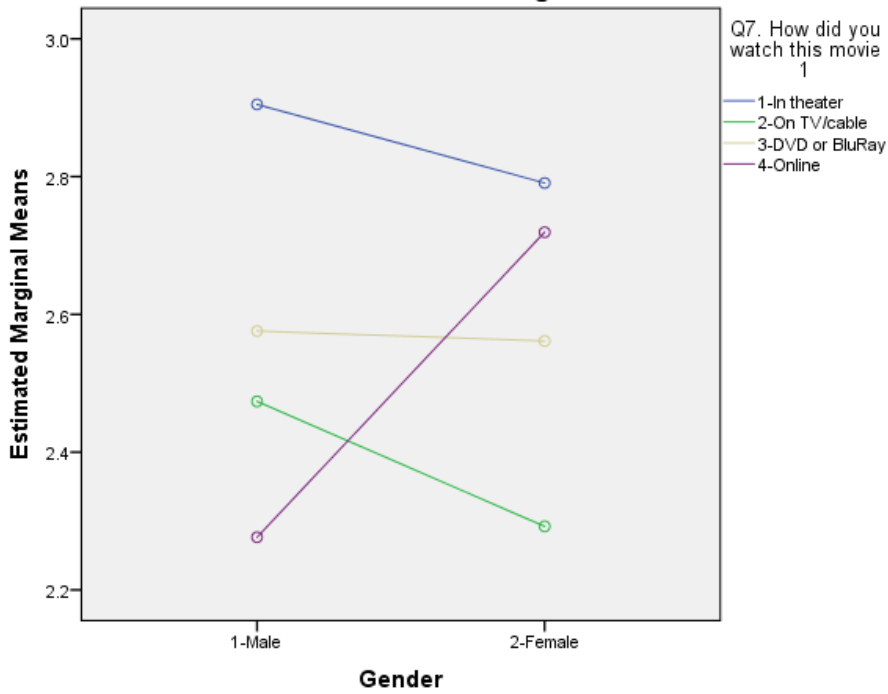


Estimated Marginal Means of Q23i. I have a collection of DVDs and/or BluRays.

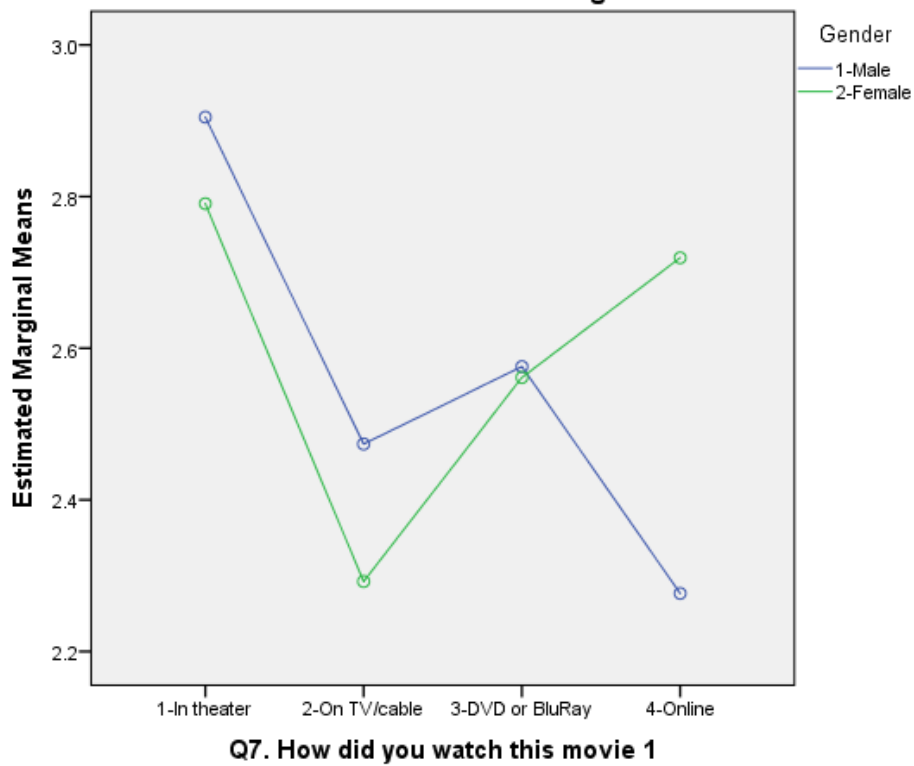


Q23j. Often we watch movies in the car on trips, short or long

Estimated Marginal Means of Q23j. Often we watch movies in the car on trips, short or long.



Estimated Marginal Means of Q23j. Often we watch movies in the car on trips, short or long.



IV. Tabling

Table 1: Multivariate Statistics for MANOVA (OVERALL)

Effect		Value	F- Value	Sig.	Observed Power
Main Effect: Gender	Pillai's Trace	.009	1.056b	.368	.286
	Wilks' Lambda	.991	1.056b	.368	.286
	Hotelling's Trace	.009	1.056b	.368	.286
	Roy's Largest Root	.009	1.056b	.368	.286
Main Effect: Q7 – How did you watch this movie?	Pillai's Trace	.070	2.847	.003	.965
	Wilks' Lambda	.931	2.868	.002	.914
	Hotelling's Trace	.074	2.877	.002	.967
	Roy's Largest Root	.054	6.400c	<.001	.968
Interaction: Gender * Q7 – How did you watch this movie?	Pillai's Trace	.023	.907	.519	.460
	Wilks' Lambda	.977	.905	.520	.370
	Hotelling's Trace	.023	.904	.521	.459
	Roy's Largest Root	.017	2.050c	.107	.524

a. Design: Intercept + Gender + Q7 + Gender * Q7

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

Table 2.

Two-Factor ANOVA Predicting Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media

	Mean	<i>sd</i>	<i>n</i>	Sum of Squares	<i>df</i>	Mean Square	F	Sig.	Partial eta ²
Main Effect: Gender				8.024	1	8.024	1.694	.194	.005
1 Male	3.62	2.186	141						
2 Female	3.44	2.246	222						
Main Effect: Q7. How did you watch this movie?				69.841	3	23.280	4.916	.002	.040
1 In theater	3.59 ^{ab}	2.129	85						
2 On TV/cable	3.31 ^a	2.302	84						
3 Via DVD/BluRay	4.21 ^b	2.281	90						
4 Online	3.01 ^a	2.041	104						
Interaction: Gender X Q7				27.845	3	9.282	1.960	.120	.016
Male/In theater	3.52	2.098	42						
Female/In theater	3.65	2.181	43						
Male/On TV/cable	4.42	2.317	19						
Female/On TV/cable	2.98	2.211	65						
Male/Via DVD/BluRay	4.27	2.140	33						
Female/Via DVD/BluRay	4.18	2.376	57						
Male/Online	2.94	2.068	47						
Female/Online	3.07	2.034	57						
Error				1681.2	355	4.736			
Corrected Total				1786.7	362				

NOTE: The grand mean for this analysis was 3.51

NOTE: For the main effect of Q7, those means that do not share a superscript are significantly different at $p < .05$.

Figure 1. Nearly near-significant interaction of gender and Q7 in the prediction of Q23g.

Estimated Marginal Means of Q23g. When I like a TV show, sometimes I buy the complete season on DVD or other media.

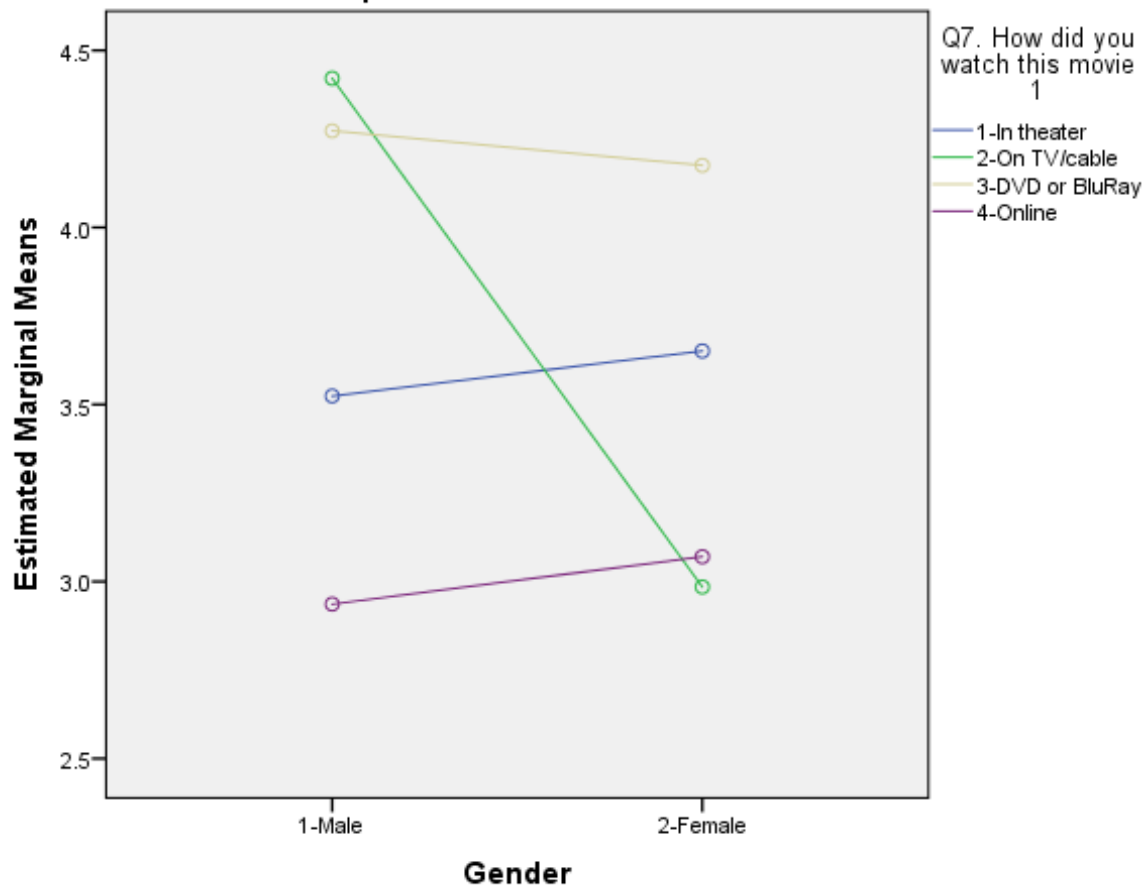


Table 3.
Two-Factor ANOVA predicting Q23i. I have a collection of DVDs and/or BlueRays

	Mean	<i>sd</i>	<i>n</i>	Sum of Squares	<i>df</i>	Mean Square	F	Sig.	Partial eta ²
Main Effect: Gender				.033	1	.033	.007	.932	.000
1 Male	4.22	2.091	141						
2 Female	4.43	2.229	222						
Main Effect: Q7. How did you watch this movie?				69.835	3	23.278	5.084	.002	.041
1 In theater	4.00 ^a	2.121	85						
2 On TV/cable	4.43 ^{ab}	2.251	84						
3 Via DVD/BluRay	5.03 ^b	2.036	90						
4 Online	3.97 ^a	2.156	104						
Interaction: Gender X Q7				19.782	3	6.594	1.440	.231	.012
Male/In theater	3.95	2.071	42						
Female/In theater	4.05	2.193	43						
Male/On TV/cable	5.05	1.985	19						
Female/On TV/cable	4.25	2.305	65						
Male/Via DVD/BluRay	4.94	1.968	33						
Female/Via DVD/BluRay	5.09	2.090	57						
Male/Online	3.62	2.038	47						
Female/Online	4.26	2.224	57						
Error				1625.4	355	4.579			
Corrected Total				1714.3	362				

NOTE: The grand mean for this analysis 4.35

Table 4.

Two-Factor ANOVA Q23j. Often we watch movies in the car on trips, short or long.

	Mean	<i>sd</i>	<i>n</i>	Sum of Squares	<i>df</i>	Mean Square	F	Sig.	Partial eta ²
Main Effect: Gender				.088	1	.088	.023	.879	.000
1 Male	2.56	1.822	141						
2 Female	2.57	2.003	222						
Main Effect: Q7. How did you watch this movie?				9.070	3	3.023	.805	.492	.007
1 In theater	2.85	2.027	85						
2 On TV/cable	2.33	1.922	84						
3 Via DVD/BluRay	2.57	1.949	90						
4 Online	2.52	1.843	104						
Interaction: Gender X Q7				5.375	3	1.792	.477	.699	.004
Male/In theater	2.90	1.948	42						
Female/In theater	2.79	2.122	43						
Male/On TV/cable	2.47	1.837	19						
Female/On TV/cable	2.29	1.958	65						
Male/Via DVD/BluRay	2.58	1.871	33						
Female/Via DVD/BluRay	2.56	2.009	57						
Male/Online	2.28	1.664	47						
Female/Online	2.72	1.971	57						
Error				1333.9	355	3.758			
Corrected Total				1351.2	362				

NOTE: The grand mean for this analysis was 2.56

V. Write up of Results

Three dependent variables were selected from the Jeffres and Neuendorf (2015) Film and TV Usage National Survey, all of which have significant intercorrelations at $p < .001$. The variables are as follows, with all measured using a 1-7 response scale (1="not like me at all"; 7="very much like me"):

Q23g. "When I like a TV show, sometimes I buy the complete season on DVD or other media."

Q23i. "I have a collection of DVDs and/or Blue Rays"

Q23j. "Often we watch movies in the car on trips, short or long."

Independent variables chosen were Gender and Q7. "How did you watch this movie 1?" (1 = In a theater, 2 = On TV/Cable, 3 = DVD/Blu-ray, 4 = Online). The factorial design is 2 x 4.

Assumptions

Box's M tested for homoscedasticity. It specifically tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups. It is ideal for Box's M to be non-significant to reject the null. For this set of variables Box's M was not significant, $p = .521$.

Multivariate Tests

The multivariate tests in Table 1 indicate that the variable Gender does not have a significant main effect on the set of dependent variables; Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root are all $p = .368$. However Table 1 also shows that Q7. "How did you watch this movie 1?" had a significant main effect on the set of dependent variables; Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root are all significant at $p < .01$. The interaction effect test indicates no significance for Pillai's Trace, Wilks' Lambda, and Hotelling's Trace; the Roy's Largest Root is nearly near-significant at $p = .107$. A series of three ANOVAs were conducted to further examine the main effects and interaction effect for each of the three dependent variables individually.

ANOVAS

Table 2 shows the ANOVA predicting Q23g. “When I like a TV show, sometimes I buy the complete season on DVD or other media.” The table indicates the main effect of Q7. “How did you watch this movie 1?” is significant at $p < .01$. However the main effect of Gender is not, the interaction is also not significant (although it is nearly near-significant at $p = .120$, and will be interpreted as an example only.) The main effect of Q7. “How did you watch this movie 1?” shows people who tend to watch films via DVD/Blue Ray (group 3) are the highest on the basis of buying complete seasons on DVD or other media when they like a TV show. The lowest group is those who watched their last film online (group 4). Using a set of Tukey HSD post hoc tests, it was found that group 3 (DVD or BluRay) was significantly higher than groups 2 (on TV/cable) and 4 (Online).

The nearly near-significant interaction for the prediction of Q23g is shown graphically in Figure 1. This shows that for three of the Q7 groups (1: In theater, 3: DVD/BluRay, and 4: Online), males and females are pretty equivalent in their complete season buying (Q23g). However, for group 2 (On TV/cable) we found that males are much higher than are females. In fact, the males from group 2 have the highest mean on Q23g (i.e., the most complete season buying) of any of the eight groups. This seems to be the sole basis of the near-near significance of the interaction.

Table 3 shows the ANOVA predicting Q23i. “I have a collection of DVDs and/or Blue Rays”. The table indicates that the main effect for Q7. “How did you watch this movie 1?” is significant at $p < .01$. The main effect for Gender and the interaction are both non-significant. The main effect of Q7. “How did you watch this movie 1?” shows people who responded “via DVD/Blue Ray” (group 3) are highest in collecting DVDs and/or BluRays. Using a set of Tukey

HSD post hoc tests, it was found that group 3 (DVD or BluRay) was significantly higher than groups 1 (In theater) and 4 (Online).

Table 4 shows the ANOVA predicting Q23j. "Often we watch movies in the car on trips, short or long." The table indicates both main effects of Gender and Q7. "How did you watch this movie 1?" are both non-significant. The interaction is also not significant.