

# The SAS System

Obs	title	network	rating	type	year
1	The Andy Griffith Show	CBS	27.8	comedy	1961
2	The Danny Thomas Show	CBS	25.9	comedy	1961
3	Perry Mason	CBS	24.9	drama	1961
4	Gunsmoke	CBS	28.3	drama	1961
5	The Untouchables	ABC	27.0	drama	1961
6	Cheyenne	ABC	22.0	drama	1961
7	The Flintstones	ABC	22.9	comedy	1961
8	Dr. Kildare	NBC	25.6	drama	1961
9	The Joey Bishop Show	NBC	22.6	comedy	1961

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Obs	title	network	rating	type	year
1	Three's Company	ABC	30.3	comedy	1979
2	Angie	ABC	26.7	comedy	1979
3	Charlie's Angels	ABC	24.4	drama	1979
4	All in the Family	CBS	24.9	comedy	1979
5	Lou Grant	CBS	19.7	drama	1979
6	One Day at a Time	CBS	21.6	comedy	1979
7	LittleHouse on Prairie	NBC	23.1	drama	1979
8	CHiPs	NBC	20.3	drama	1979
9	Diff'rent Strokes	NBC	20.3	comedy	1979

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Obs	title	network	rating	type	year
1	Dallas	CBS	34.5	drama	1980
2	Archie Bunker's Place	CBS	21.4	comedy	1980
3	The Love Boat	ABC	24.3	comedy	1980
4	Happy Days	ABC	20.8	comedy	1980
5	Dynasty	ABC	20.2	drama	1980
6	The Facts of Life	NBC	19.3	comedy	1980
7	LittleHouse on Prairie	NBC	22.1	drama	1980

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Obs	title	network	rating	type	year
1	Dallas	CBS	21.9	drama	1986
2	Kate & Allie	CBS	20.0	comedy	1986
3	Growing Pains	ABC	19.5	comedy	1986
4	Hotel	ABC	18.3	drama	1986
5	Family Ties	NBC	30.0	comedy	1986
6	Miami Vice	NBC	21.3	drama	1986
7	Night Court	NBC	20.9	comedy	1986

Obs	title	network	rating	type	year
1	Murphy Brown	CBS	14.1	comedy	1995
2	Chicago Hope	CBS	11.7	drama	1995
3	Home Improvement	ABC	19.5	comedy	1995
4	NYPD Blue	ABC	16.5	drama	1995
5	Seinfeld	NBC	20.6	comedy	1995
6	Friends	NBC	15.6	comedy	1995
7	Law & Order	NBC	12.2	drama	1995

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Obs	title	network	rating	type	year
1	EverybodyLovesRaymond	CBS	10.6	comedy	1999
2	JAG	CBS	9.8	drama	1999
3	The Drew Carey Show	ABC	9.9	comedy	1999
4	NYPD Blue	ABC	10.5	drama	1999
5	ER	NBC	17.8	drama	1999
6	Frasier	NBC	15.6	comedy	1999
7	Providence	NBC	9.8	drama	1999

Obs	title	network	rating	type	year
1	Survivor	CBS	17.4	drama	2000
2	Becker	CBS	10.9	comedy	2000
3	Judging Amy	CBS	9.9	drama	2000
4	The Practice	ABC	11.7	drama	2000
5	Spin City	ABC	8.5	comedy	2000
6	Law & Order	NBC	12.3	drama	2000
7	Will & Grace	NBC	11.3	comedy	2000

Obs	title	network	rating	type	year
1	CSI:Crime Scene Invest	CBS	12.2	drama	2006
2	Without a Trace	CBS	9.4	drama	2006
3	Two and a Half Men	CBS	9.7	comedy	2006
4	Desperate Housewives	ABC	10.8	comedy	2006
5	Brothers & Sisters	ABC	7.3	drama	2006
6	Heroes	NBC	8.0	drama	2006
7	The Office	NBC	7.1	comedy	2006



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14	Lou Grant	CBS	19.7	drama	1979
15	One Day at a Time	CBS	21.6	comedy	1979
16	LittleHouse on Prairie	NBC	23.1	drama	1979
17	CHiPs	NBC	20.3	drama	1979
18	Diffrent Strokes	NBC	20.3	comedy	1979
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29	Hotel	ABC	18.3	drama	1986
30	Family Ties	NBC	30.0	comedy	1986
31	Miami Vice	NBC	21.3	drama	1986
32	Night Court	NBC	20.9	comedy	1986
33	Murphy Brown	CBS	14.1	comedy	1995
34	Chicago Hope	CBS	11.7	drama	1995
35	Home Improvement	ABC	19.5	comedy	1995
36	NYPD Blue	ABC	16.5	drama	1995
37	Seinfeld	NBC	20.6	comedy	1995
38	Friends	NBC	15.6	comedy	1995

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39	Law & Order	NBC	12.2	drama	1995
40	EverybodyLovesRaymond	CBS	10.6	comedy	1999
41	JAG	CBS	9.8	drama	1999
42	The Drew Carey Show	ABC	9.9	comedy	1999
43	NYPD Blue	ABC	10.5	drama	1999
44	ER	NBC	17.8	drama	1999
45	Frasier	NBC	15.6	comedy	1999
46	Providence	NBC	9.8	drama	1999
47	Survivor	CBS	17.4	drama	2000
48	Becker	CBS	10.9	comedy	2000
49	Judging Amy	CBS	9.9	drama	2000
50	The Practice	ABC	11.7	drama	2000
51	Spin City	ABC	8.5	comedy	2000
52	Law & Order	NBC	12.3	drama	2000
53	Will & Grace	NBC	11.3	comedy	2000
54	CSI:Crime Scene Invest	CBS	12.2	drama	2006
55	Without a Trace	CBS	9.4	drama	2006
56	Two and a Half Men	CBS	9.7	comedy	2006
57	Desperate Housewives	ABC	10.8	comedy	2006
58	Brothers & Sisters	ABC	7.3	drama	2006
59	Heroes	NBC	8.0	drama	2006
60	The Office	NBC	7.1	comedy	2006

The FREQ Procedure

network	Frequency	Percent	Cumulative Frequency	Cumulative Percent
ABC	19	31.67	19	31.67
CBS	21	35.00	40	66.67
NBC	20	33.33	60	100.00

type	Frequency	Percent	Cumulative Frequency	Cumulative Percent
comedy	30	50.00	30	50.00
drama	30	50.00	60	100.00

year	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1961	9	15.00	9	15.00
1979	9	15.00	18	30.00
1980	7	11.67	25	41.67
1986	7	11.67	32	53.33
1995	7	11.67	39	65.00
1999	7	11.67	46	76.67
2000	7	11.67	53	88.33
2006	7	11.67	60	100.00

## The GLM Procedure

Class Level Information		
Class	Levels	Values
network	3	ABC CBS NBC
type	2	comedy drama
year	8	1961 1979 1980 1986 1995 1999 2000 2006

<b>Number of Observations Read</b>	60
<b>Number of Observations Used</b>	60

The GLM Procedure

Dependent Variable: rating

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	47	2564.347500	54.560585	4.09	0.0055
Error	12	160.005000	13.333750		
Corrected Total	59	2724.352500			

R-Square	Coeff Var	Root MSE	rating Mean
0.941269	20.03589	3.651541	18.22500

Source	DF	Type I SS	Mean Square	F Value	Pr > F
network	2	5.724826	2.862413	0.21	0.8098
type	1	18.435323	18.435323	1.38	0.2625
year	7	2109.265274	301.323611	22.60	<.0001
network*type	2	24.464600	12.232300	0.92	0.4258
network*year	14	235.511397	16.822243	1.26	0.3469
type*year	7	74.190257	10.598608	0.79	0.6060
network*type*year	14	96.755823	6.911130	0.52	0.8795

Source	DF	Type III SS	Mean Square	F Value	Pr > F
network	2	4.234938	2.117469	0.16	0.8549
type	1	0.002917	0.002917	0.00	0.9884
year	7	1946.440475	278.062925	20.85	<.0001
network*type	2	16.193722	8.096861	0.61	0.5608
network*year	14	223.609566	15.972112	1.20	0.3810
type*year	7	81.566807	11.652401	0.87	0.5533
network*type*year	14	96.755823	6.911130	0.52	0.8795

The GLM Procedure

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network	3	ABC CBS NBC
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network*type	2	16.193722	8.096861	0.61	0.5608
network*year	14	223.609566	15.972112	1.20	0.3810
type*year	7	81.566807	11.652401	0.87	0.5533
network*type*year	14	96.755823	6.911130	0.52	0.8795

## The GLM Procedure

Source	Type III Expected Mean Square
<b>network</b>	$\text{Var}(\text{Error}) + 1.1433 \text{ Var}(\text{network}*\text{type}*\text{year}) + 2.2867 \text{ Var}(\text{network}*\text{year}) + Q(\text{network},\text{network}*\text{type})$
<b>type</b>	$\text{Var}(\text{Error}) + 1.1429 \text{ Var}(\text{network}*\text{type}*\text{year}) + 3.4286 \text{ Var}(\text{type}*\text{year}) + Q(\text{type},\text{network}*\text{type})$
<b>year</b>	$\text{Var}(\text{Error}) + 1.1501 \text{ Var}(\text{network}*\text{type}*\text{year}) + 3.4504 \text{ Var}(\text{type}*\text{year}) + 2.3003 \text{ Var}(\text{network}*\text{year}) + 6.9009 \text{ Var}(\text{year})$
<b>network*type</b>	$\text{Var}(\text{Error}) + 1.1433 \text{ Var}(\text{network}*\text{type}*\text{year}) + Q(\text{network}*\text{type})$
<b>network*year</b>	$\text{Var}(\text{Error}) + 1.1613 \text{ Var}(\text{network}*\text{type}*\text{year}) + 2.3226 \text{ Var}(\text{network}*\text{year})$
<b>type*year</b>	$\text{Var}(\text{Error}) + 1.1501 \text{ Var}(\text{network}*\text{type}*\text{year}) + 3.4504 \text{ Var}(\text{type}*\text{year})$
<b>network*type*year</b>	$\text{Var}(\text{Error}) + 1.1613 \text{ Var}(\text{network}*\text{type}*\text{year})$



The GLM Procedure  
 Tests of Hypotheses for Mixed Model Analysis of Variance

Dependent Variable: rating

	Source	DF	Type III SS	Mean Square	F Value	Pr > F
*	network	2	4.234938	2.117469	0.13	0.8766
	Error	14.367	228.881993	15.931296		
Error: 0.9845*MS(network*year) + 0.0155*MS(Error)						
* This test assumes one or more other fixed effects are zero.						

	Source	DF	Type III SS	Mean Square	F Value	Pr > F
*	type	1	0.002917	0.002917	0.00	0.9878
	Error	7.1024	82.835173	11.663059		
Error: 0.9937*MS(type*year) + 0.0063*MS(Error)						
* This test assumes one or more other fixed effects are zero.						

Source	DF	Type III SS	Mean Square	F Value	Pr > F
year	7	1946.440475	278.062925	13.48	0.0002
Error	10.475	216.051977	20.626303		
Error: 0.9904*MS(network*year) + MS(type*year) - 0.9904*MS(network*type*year) + 67E-17*MS(Error)					

Source	DF	Type III SS	Mean Square	F Value	Pr > F
network*type	2	16.193722	8.096861	1.15	0.3418
Error	14.846	104.076187	7.010488		
Error: 0.9845*MS(network*type*year) + 0.0155*MS(Error)					

Source	DF	Type III SS	Mean Square	F Value	Pr > F
network*year	14	223.609566	15.972112	2.31	0.0645
Error	14	96.755823	6.911130		
Error: MS(network*type*year)					

Source	DF	Type III SS	Mean Square	F Value	Pr > F
type*year	7	81.566807	11.652401	1.67	0.1932
Error	14.523	101.267922	6.972854		
Error: 0.9904*MS(network*type*year) + 0.0096*MS(Error)					

Source	DF	Type III SS	Mean Square	F Value	Pr > F
network*type*year	14	96.755823	6.911130	0.52	0.8795
Error: MS(Error)	12	160.005000	13.333750		

The Mixed Procedure

Model Information	
Data Set	WORK.ALL
Dependent Variable	rating
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Kenward-Roger
Degrees of Freedom Method	Kenward-Roger

Class Level Information		
Class	Levels	Values
network	3	ABC CBS NBC
type	2	comedy drama
year	8	1961 1979 1980 1986 1995 1999 2000 2006

Dimensions	
Covariance Parameters	5
Columns in X	12
Columns in Z	96
Subjects	1
Max Obs per Subject	60

Number of Observations	
Number of Observations Read	60
Number of Observations Used	60
Number of Observations Not Used	0

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	378.22722490	
1	4	322.43253509	0.00056244
2	2	322.37640527	0.00001835
3	1	322.37430608	0.00000003
4	1	322.37430254	0.00000000

Convergence criteria met.

The Mixed Procedure

Covariance Parameter Estimates							
Cov Parm	Estimate	Standard Error	Z Value	Pr > Z	Alpha	Lower	Upper
year	38.3907	21.9020	1.75	0.0398	0.1	18.4188	137.95
network*year	2.8514	2.7524	1.04	0.1501	0.1	0.9758	46.9015
type*year	0.5287	1.8867	0.28	0.3896	0.1	0.09101	2.565E15
network*type*year	0	.	.	.	.	.	.
Residual	9.6644	2.6046	3.71	0.0001	0.1	6.5273	16.0633

Fit Statistics	
-2 Res Log Likelihood	322.4
AIC (Smaller is Better)	330.4
AICC (Smaller is Better)	331.2
BIC (Smaller is Better)	330.7

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
network	2	13.8	0.10	0.9024
type	1	6.5	0.10	0.7636
network*type	2	29.2	0.93	0.4056

Least Squares Means							
Effect	network	type	Estimate	Standard Error	DF	t Value	Pr >  t
network	ABC		17.4440	2.3916	8.66	7.29	<.0001
network	CBS		18.0238	2.3832	8.53	7.56	<.0001
network	NBC		17.6118	2.3866	8.58	7.38	<.0001
type		comedy	17.8348	2.3072	7.54	7.73	<.0001
type		drama	17.5517	2.3075	7.55	7.61	<.0001