

5-3-07/2 grps reported / Interaction / simple effects¹

The SAS System

21:19 Tuesday, May 2, 2006 54

The Mixed Procedure

Model Information

VC

Data Set	WORK.BIO2_REP2GRP
Dependent Variable	MinHR
Covariance Structure	Variance Components
Subject Effect	Subject
Estimation Method	REML
Residual Variance Method	Parameter
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Between-Within

This example
the response
is Min HR

Class Level Information

Class	Levels	Values
Subject	24	10g 10x 11g 11x 12g 12x 1g 1x 2g 2x 3g 3x 4g 4x 5g 5x 6g 6x 7g 7x 8g 8x 9g 9x
Supp	2	G X
Time	3	0 1 2

Dimensions

Covariance Parameters	1
Columns in X	12
Columns in Z	0
Subjects	24
Max Obs Per Subject	3

Number of Observations

Number of Observations Read	72
Number of Observations Used	72
Number of Observations Not Used	0

Iteration History

Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	451.45439589	
1	1	451.45439589	0.00000000

Convergence criteria met.

The Mixed Procedure

Estimated R Matrix for Subject 10g

VC

Row	Col1	Col2	Col3
1	43.6604		
2		43.6604	
3			43.6604

"VC fit"

Estimated R Correlation Matrix for Subject 10g

Row	Col1	Col2	Col3
1	1.0000		
2		1.0000	
3			1.0000

Covariance Parameter Estimates

Cov Parm	Subject	Estimate
Residual	Subject	43.6604

Fit Statistics

-2 Res Log Likelihood	451.5
AIC (smaller is better)	453.5
AICC (smaller is better)	453.5
BIC (smaller is better)	454.6

Null Model Likelihood Ratio Test

DF	Chi-Square	Pr > ChiSq
0	0.00	1.0000

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
Supp	1	22	0.44	0.5162
Time	2	44	1.21	0.3093
Supp*Time	2	44	0.44	0.6497

Note Interaction not sign. ---

The Mixed Procedure

Model Information

CS

Data Set	WORK.BIO2_REP2GRP
Dependent Variable	MinHR
<u>Covariance Structure</u>	<u>Compound Symmetry</u>
Subject Effect	Subject
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Between-Within

Class Level Information

Class	Levels	Values
Subject	24	10g 10x 11g 11x 12g 12x 1g 1x 2g 2x 3g 3x 4g 4x 5g 5x 6g 6x 7g 7x 8g 8x 9g 9x
Supp	2	G X
Time	3	0 1 2

Dimensions

<u>Covariance Parameters</u>	<u>2</u>
Columns in X	12
Columns in Z	0
Subjects	24
Max Obs Per Subject	3

Number of Observations

Number of Observations Read	72
Number of Observations Used	72
Number of Observations Not Used	0

Iteration History

Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	451.45439589	
1	1	404.68743995	0.00000000

Convergence criteria met.

The Mixed Procedure

Estimated R Matrix for Subject 10g

Row	Col1	Col2	Col3
1	43.6604	34.2500	34.2500
2	34.2500	43.6604	34.2500
3	34.2500	34.2500	43.6604

CS

CS fit

Estimated R Correlation Matrix for Subject 10g

Row	Col1	Col2	Col3
1	1.0000	0.7845	0.7845
2	0.7845	1.0000	0.7845
3	0.7845	0.7845	1.0000

H_0 : CS same VC
 H_A : CS better than VC

Covariance Parameter Estimates

Cov Parm	Subject	Estimate
CS	Subject	34.2500
Residual		9.4104

L ratio test =
 $451.5 - 404.7$
 $= 46.8$
 $df = 2 - 1$

Fit Statistics

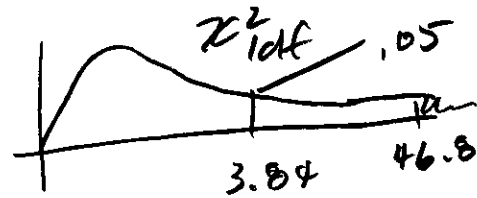
-2 Res Log Likelihood	404.7
AIC (smaller is better)	408.7
AICC (smaller is better)	408.9
BIC (smaller is better)	411.0

Null Model Likelihood Ratio Test

DF	Chi-Square	Pr > ChiSq
1	46.77	<.0001

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
Supp	1	22	0.17	0.6845
Time	2	44	5.59	0.0069
Supp*Time	2	44	2.02	0.1447



Conclude CS provides additional info vs VC.

Note now less than

VC version

The Mixed Procedure

Model Information

UN

Data Set	WORK.BIO2_REP2GRP
Dependent Variable	MinHR
<u>Covariance Structure</u>	<u>Unstructured</u>
Subject Effect	Subject
Estimation Method	REML
Residual Variance Method	None
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Between-Within

Class Level Information

Class	Levels	Values
Subject	24	10g 10x 11g 11x 12g 12x 1g 1x 2g 2x 3g 3x 4g 4x 5g 5x 6g 6x 7g 7x 8g 8x 9g 9x
Supp	2	G X
Time	3	0 1 2

Dimensions

<u>Covariance Parameters</u>	<u>6</u>
Columns in X	12
Columns in Z	0
Subjects	24
Max Obs Per Subject	3

Number of Observations

Number of Observations Read	72
Number of Observations Used	72
Number of Observations Not Used	0

Iteration History

Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	451.45439589	
1	1	393.15710713	0.00000000

Convergence criteria met.

The Mixed Procedure

Estimated R Matrix for Subject 10g

Row	Col1	Col2	Col3
1	36.3561	34.5379	34.8447
2	34.5379	40.6894	33.3674
3	34.8447	33.3674	53.9356

unstructured structure fit. Notice 6 different values for the 3 variances (diag) and 3 cov parameters

Estimated R Correlation Matrix for Subject 10g

Row	Col1	Col2	Col3
1	1.0000	0.8980	0.7869
2	0.8980	1.0000	0.7123
3	0.7869	0.7123	1.0000

H₀: UN not additional info over CS

H_A: UN additional info over CS

Covariance Parameter Estimates

Cov Parm	Subject	Estimate
UN(1,1)	Subject	36.3561
UN(2,1)	Subject	34.5379
UN(2,2)	Subject	40.6894
UN(3,1)	Subject	34.8447
UN(3,2)	Subject	33.3674
UN(3,3)	Subject	53.9356

$L_{ratio} = 404.7 - 393.2 = 11.5$

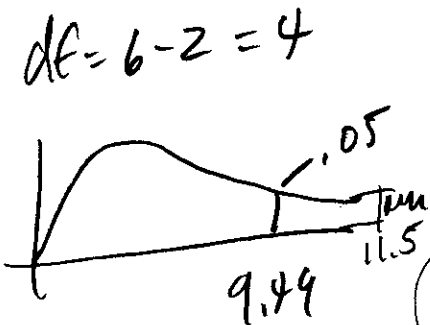
Fit Statistics

-2 Res Log Likelihood	393.2
AIC (smaller is better)	405.2
AICC (smaller is better)	406.6
BIC (smaller is better)	412.2

Null Model Likelihood Ratio Test

DF	Chi-Square	Pr > ChiSq
5	58.30	<.0001

Not useful here.



We will use UN structure to look at means.

The Mixed Procedure

Type 3 Tests of Fixed Effects

UN

Effect	Num DF	Den DF	F Value	Pr > F
Supp	1	22	0.17	0.6845
Time	2	22	9.44	0.0011
Supp*Time	2	22	5.17	0.0144

Interaction =>
simple effects

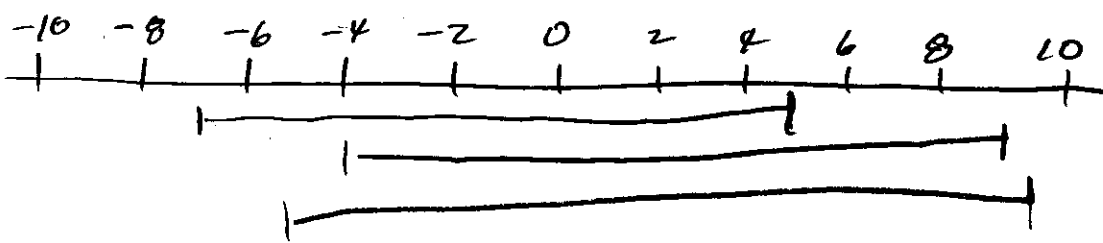
Least Squares Means

cell means

Effect	Supp	Time	Estimate	Standard Error	DF	t Value	Pr > t	Alpha	Lower	Upper
Supp*Time	G	0	47.0833	1.7406	22	27.05	<.0001	0.02	42.7174	51.4493
Supp*Time	G	1	46.2500	1.8414	22	25.12	<.0001	0.02	41.6312	50.8688
Supp*Time	G	2	48.5833	2.1201	22	22.92	<.0001	0.02	43.2655	53.9011
Supp*Time	X	0	48.0833	1.7406	22	27.62	<.0001	0.02	43.7174	52.4493
Supp*Time	X	1	43.9167	1.8414	22	23.85	<.0001	0.02	39.2978	48.5355
Supp*Time	X	2	46.8333	2.1201	22	22.09	<.0001	0.02	41.5155	52.1511

Obs	Effect	Supp	Time	_Supp	_Time	Estimate	StdErr	DF	tValue	Probt	Alpha	Lower	Upper
1	Supp*Time	G	0	X	0	-1.0000	2.4616	22	-0.41	0.6885	0.02	-7.1744	5.1744
2	Supp*Time	G	1	X	1	2.3333	2.6041	22	0.90	0.3799	0.02	-4.1987	8.8654
3	Supp*Time	G	2	X	2	1.7500	2.9982	22	0.58	0.5654	0.02	-5.7705	9.2705

simple effects G minus X of time 0, 1, 2



Not one of these is totally contained in the other two

