APPENDIX D

Mixed Effect Modeling

D1 - Mixed Effect Modeling Based on Block Wipe Data as $\mu g/cm^2$ Block Wipe and Hand Rub Data as $\mu g/cm^2$ Hand

D2 - Mixed Effect Modeling Based on Block Wipe Data as $\mu g/cm^2$ Test Coupon and Hand Rub Data as $\mu g/cm^2$ Hand

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Arsenic

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LR
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	9
Columns in Z	108
Subjects	1
Max Obs Per Subject	567
Observations Used	567
Observations Not Used	0
Total Observations	567

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1420.88650862	
1	2	1205.15736386	0.00001386
2	1	1205.15613641	0.00000001

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Arsenic

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2317
DECKID	0.06548
Stack*HANDID	0.02733
Residual	0.3717

Fit Statistics	
-2 Res Log Likelihood	1205.2
AIC (smaller is better)	1213.2
AICC (smaller is better)	1213.2
BIC (smaller is better)	1218.8

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		-3.2750	0.2174	16	-15.07	<.0001
REGION	North	-0.2099	0.2469	487	-0.85	0.3958
REGION	South	0	.	.	.	.
AGE		-0.2985	0.08826	487	-3.38	0.0008
AGE*AGE		0.01684	0.005332	487	3.16	0.0017
AGE*REGION	North	0.3138	0.1007	487	3.12	0.0019
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	-0.01924	0.005828	487	-3.30	0.0010
AGE*AGE*REGION	South	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Arsenic

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	487	0.72	0.3958
AGE	1	487	7.91	0.0051
AGE*AGE	1	487	6.13	0.0136
AGE*REGION	1	487	9.72	0.0019
AGE*AGE*REGION	1	487	10.90	0.0010

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	-3.5842	0.1274	487	-28.14	<.0001
REGION	South	-3.7867	0.1329	487	-28.49	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Chromium

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LR
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	9
Columns in Z	108
Subjects	1
Max Obs Per Subject	569
Observations Used	569
Observations Not Used	0
Total Observations	569

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1454.12654848	
1	2	1239.85905873	0.00000229
2	1	1239.85882250	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Chromium

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2353
DECKID	0.07407
Stack*HANDID	0.03180
Residual	0.3918

Fit Statistics	
-2 Res Log Likelihood	1239.9
AIC (smaller is better)	1247.9
AICC (smaller is better)	1247.9
BIC (smaller is better)	1253.5

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		-3.5875	0.2282	16	-15.72	<.0001
REGION	North	-0.1576	0.2611	489	-0.60	0.5463
REGION	South	0	.	.	.	.
AGE		-0.3201	0.09327	489	-3.43	0.0006
AGE*AGE		0.01797	0.005634	489	3.19	0.0015
AGE*REGION	North	0.3098	0.1064	489	2.91	0.0038
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	-0.01923	0.006159	489	-3.12	0.0019
AGE*AGE*REGION	South	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Chromium

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	489	0.36	0.5463
AGE	1	489	9.63	0.0020
AGE*AGE	1	489	7.35	0.0069
AGE*REGION	1	489	8.48	0.0038
AGE*AGE*REGION	1	489	9.75	0.0019

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	-3.9125	0.1318	489	-29.69	<.0001
REGION	South	-4.1454	0.1376	489	-30.12	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Copper

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LR
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	9
Columns in Z	108
Subjects	1
Max Obs Per Subject	568
Observations Used	568
Observations Not Used	0
Total Observations	568

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1332.71866249	
1	3	1132.12248182	0.00001163
2	1	1132.12190007	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Copper

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.1763
DECKID	0.05131
Stack*HANDID	0.03461
Residual	0.3248

Fit Statistics	
-2 Res Log Likelihood	1132.1
AIC (smaller is better)	1140.1
AICC (smaller is better)	1140.2
BIC (smaller is better)	1145.7

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		-3.5943	0.1941	14	-18.52	<.0001
REGION	North	0.2133	0.2207	490	0.97	0.3343
REGION	South	0	.	.	.	.
AGE		-0.00262	0.07875	490	-0.03	0.9735
AGE*AGE		-0.00060	0.004756	490	-0.13	0.8995
AGE*REGION	North	0.02632	0.08985	490	0.29	0.7697
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	-0.00200	0.005200	490	-0.38	0.7013
AGE*AGE*REGION	South	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Copper

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	490	0.93	0.3343
AGE	1	490	0.05	0.8148
AGE*AGE	1	490	0.38	0.5391
AGE*REGION	1	490	0.09	0.7697
AGE*AGE*REGION	1	490	0.15	0.7013

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	-3.4427	0.1135	490	-30.32	<.0001
REGION	South	-3.6597	0.1184	490	-30.92	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Arsenic

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LR
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	12
Columns in Z	108
Subjects	1
Max Obs Per Subject	567
Observations Used	567
Observations Not Used	0
Total Observations	567

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Arsenic

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1395.57063553	
1	3	1178.34056028	0.00005541
2	1	1178.33640403	0.00000005
3	1	1178.33640067	0.00000000

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2314
DECKID	0.06848
Stack*HANDID	0.02792
Residual	0.3716

Fit Statistics	
-2 Res Log Likelihood	1178.3
AIC (smaller is better)	1186.3
AICC (smaller is better)	1186.4
BIC (smaller is better)	1191.9

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			-3.9610	0.1876	13	-21.11	<.0001
REGION	North		-0.1085	0.2599	490	-0.42	0.6766
REGION	South		0	.	.	.	.
AGECAT		2	0.3848	0.2175	490	1.77	0.0775
AGECAT		3	-0.4223	0.2607	490	-1.62	0.1059
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	0.2262	0.3226	490	0.70	0.4836
REGION*AGECAT	North	3	1.0179	0.3683	490	2.76	0.0059

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Arsenic

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	490	4.90	0.0273
AGECAT	2	490	5.98	0.0027
REGION*AGECAT	2	490	4.38	0.0130

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	-3.4585	0.1564	490	-22.11	<.0001
REGION*AGECAT	North	3	-3.4739	0.1878	490	-18.50	<.0001
REGION*AGECAT	North	4	-4.0694	0.2208	490	-18.43	<.0001
REGION*AGECAT	South	2	-3.5762	0.1687	490	-21.20	<.0001
REGION*AGECAT	South	3	-4.3833	0.2217	490	-19.77	<.0001
REGION*AGECAT	South	4	-3.9610	0.1876	490	-21.11	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Chromium

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LR
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	12
Columns in Z	108
Subjects	1
Max Obs Per Subject	569
Observations Used	569
Observations Not Used	0
Total Observations	569

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1427.25922068	
1	3	1212.57787220	0.00001177
2	1	1212.57681468	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Chromium

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2349
DECKID	0.07425
Stack*HANDID	0.03237
Residual	0.3917

Fit Statistics	
-2 Res Log Likelihood	1212.6
AIC (smaller is better)	1220.6
AICC (smaller is better)	1220.6
BIC (smaller is better)	1226.2

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			-4.3427	0.1938	13	-22.41	<.0001
REGION	North		-0.06813	0.2701	492	-0.25	0.8010
REGION	South		0	.	.	.	.
AGECAT		2	0.4335	0.2260	492	1.92	0.0557
AGECAT		3	-0.4377	0.2707	492	-1.62	0.1065
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	0.2380	0.3353	492	0.71	0.4782
REGION*AGECAT	North	3	1.0002	0.3825	492	2.62	0.0092
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Chromium

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	492	5.75	0.0168
AGECAT	2	492	7.20	0.0008
REGION*AGECAT	2	492	3.87	0.0215

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	-3.7394	0.1611	492	-23.21	<.0001
REGION*AGECAT	North	3	-3.8484	0.1938	492	-19.86	<.0001
REGION*AGECAT	North	4	-4.4108	0.2284	492	-19.31	<.0001
REGION*AGECAT	South	2	-3.9092	0.1740	492	-22.47	<.0001
REGION*AGECAT	South	3	-4.7804	0.2291	492	-20.87	<.0001
REGION*AGECAT	South	4	-4.3427	0.1938	492	-22.41	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Copper

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LR
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	12
Columns in Z	108
Subjects	1
Max Obs Per Subject	568
Observations Used	568
Observations Not Used	0
Total Observations	568

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Copper

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1304.16133502	
1	3	1104.08799364	0.00042717
2	1	1104.07220768	0.00000156
3	1	1104.07215206	0.00000000

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.1758
DECKID	0.04775
Stack*HANDID	0.03559
Residual	0.3245

Fit Statistics	
-2 Res Log Likelihood	1104.1
AIC (smaller is better)	1112.1
AICC (smaller is better)	1112.1
BIC (smaller is better)	1117.7

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			-3.7672	0.1614	13	-23.34	<.0001
REGION	North		-0.1161	0.2214	491	-0.52	0.6003
REGION	South		0	.	.	.	.
AGECAT		2	0.1630	0.1853	491	0.88	0.3795
AGECAT		3	0.1511	0.2218	491	0.68	0.4960
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	0.3606	0.2748	491	1.31	0.1902
REGION*AGECAT	North	3	0.4304	0.3135	491	1.37	0.1704

MIXED MODEL ANALYSIS OF LOG(HAND/BLOCK) RATIOS

The Mixed Procedure

ANALYTE=Copper

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	491	1.57	0.2108
AGECAT	2	491	3.74	0.0245
REGION*AGECAT	2	491	1.15	0.3175

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	-3.3597	0.1352	491	-24.84	<.0001
REGION*AGECAT	North	3	-3.3017	0.1616	491	-20.44	<.0001
REGION*AGECAT	North	4	-3.8832	0.1894	491	-20.50	<.0001
REGION*AGECAT	South	2	-3.6042	0.1455	491	-24.76	<.0001
REGION*AGECAT	South	3	-3.6161	0.1899	491	-19.05	<.0001
REGION*AGECAT	South	4	-3.7672	0.1614	491	-23.34	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Arsenic

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LY
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	9
Columns in Z	108
Subjects	1
Max Obs Per Subject	567
Observations Used	567
Observations Not Used	0
Total Observations	567

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1407.86699056	
1	2	1144.09961754	0.00000422
2	1	1144.09937809	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Arsenic

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2333
DECKID	0.07203
Stack*HANDID	0.04980
Residual	0.3227

Fit Statistics	
-2 Res Log Likelihood	1144.1
AIC (smaller is better)	1152.1
AICC (smaller is better)	1152.2
BIC (smaller is better)	1157.7

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		-3.4553	0.2240	16	-15.43	<.0001
REGION	North	0.7243	0.2546	487	2.85	0.0046
REGION	South	0	.	.	.	.
AGE		0.01102	0.09099	487	0.12	0.9037
AGE*AGE		-0.00107	0.005496	487	-0.20	0.8451
AGE*REGION	North	-0.01998	0.1038	487	-0.19	0.8474
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	0.000460	0.006008	487	0.08	0.9391
AGE*AGE*REGION	South	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Arsenic

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	487	8.09	0.0046
AGE	1	487	0.00	0.9842
AGE*AGE	1	487	0.08	0.7788
AGE*REGION	1	487	0.04	0.8474
AGE*AGE*REGION	1	487	0.01	0.9391

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	-2.8375	0.1310	487	-21.66	<.0001
REGION	South	-3.4733	0.1368	487	-25.39	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Chromium

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LY
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	9
Columns in Z	108
Subjects	1
Max Obs Per Subject	569
Observations Used	569
Observations Not Used	0
Total Observations	569

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1444.96762608	
1	2	1172.73475788	0.00000032
2	1	1172.73473563	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Chromium

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2632
DECKID	0.07196
Stack*HANDID	0.04266
Residual	0.3388

Fit Statistics	
-2 Res Log Likelihood	1172.7
AIC (smaller is better)	1180.7
AICC (smaller is better)	1180.8
BIC (smaller is better)	1186.3

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		-3.4932	0.2264	16	-15.43	<.0001
REGION	North	0.7035	0.2553	489	2.76	0.0061
REGION	South	0	.	.	.	.
AGE		-0.04366	0.09118	489	-0.48	0.6322
AGE*AGE		0.001958	0.005507	489	0.36	0.7224
AGE*REGION	North	0.03880	0.1040	489	0.37	0.7093
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	-0.00314	0.006021	489	-0.52	0.6019
AGE*AGE*REGION	South	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Chromium

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	489	7.59	0.0061
AGE	1	489	0.22	0.6412
AGE*AGE	1	489	0.02	0.8979
AGE*REGION	1	489	0.14	0.7093
AGE*AGE*REGION	1	489	0.27	0.6019

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	-2.9166	0.1345	489	-21.68	<.0001
REGION	South	-3.6093	0.1400	489	-25.78	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Copper

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LY
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	9
Columns in Z	108
Subjects	1
Max Obs Per Subject	568
Observations Used	568
Observations Not Used	0
Total Observations	568

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1293.20893320	
1	2	1045.92848756	0.00066001
2	1	1045.92408945	0.00000075
3	1	1045.92408453	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Copper

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.1869
DECKID	0.05114
Stack*HANDID	0.03968
Residual	0.2721

Fit Statistics	
-2 Res Log Likelihood	1045.9
AIC (smaller is better)	1053.9
AICC (smaller is better)	1054.0
BIC (smaller is better)	1059.5

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		-2.5727	0.1927	14	-13.35	<.0001
REGION	North	-0.2001	0.2172	490	-0.92	0.3575
REGION	South	0	.	.	.	.
AGE		-0.2957	0.07751	490	-3.82	0.0002
AGE*AGE		0.01488	0.004682	490	3.18	0.0016
AGE*REGION	North	0.2176	0.08844	490	2.46	0.0142
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	-0.01260	0.005119	490	-2.46	0.0142
AGE*AGE*REGION	South	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Copper

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	490	0.85	0.3575
AGE	1	490	17.84	<.0001
AGE*AGE	1	490	11.21	0.0009
AGE*REGION	1	490	6.05	0.0142
AGE*AGE*REGION	1	490	6.06	0.0142

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	-3.0812	0.1146	490	-26.89	<.0001
REGION	South	-3.2289	0.1192	490	-27.08	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Arsenic

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LY
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	12
Columns in Z	108
Subjects	1
Max Obs Per Subject	567
Observations Used	567
Observations Not Used	0
Total Observations	567

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1372.63280253	
1	2	1114.59696529	0.00000115
2	1	1114.59691690	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Arsenic

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2334
DECKID	0.05927
Stack*HANDID	0.04969
Residual	0.3227

Fit Statistics	
-2 Res Log Likelihood	1114.6
AIC (smaller is better)	1122.6
AICC (smaller is better)	1122.7
BIC (smaller is better)	1128.2

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			-3.5292	0.1790	13	-19.71	<.0001
REGION	North		0.3177	0.2421	490	1.31	0.1900
REGION	South		0	.	.	.	.
AGECAT		2	0.07336	0.2026	490	0.36	0.7174
AGECAT		3	0.1192	0.2428	490	0.49	0.6237
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	0.3707	0.3005	490	1.23	0.2179
REGION*AGECAT	North	3	0.4030	0.3430	490	1.17	0.2406
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Arsenic

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	490	19.96	<.0001
AGECAT	2	490	2.07	0.1276
REGION*AGECAT	2	490	0.93	0.3968

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	-2.7674	0.1509	490	-18.34	<.0001
REGION*AGECAT	North	3	-2.6892	0.1792	490	-15.01	<.0001
REGION*AGECAT	North	4	-3.2115	0.2093	490	-15.35	<.0001
REGION*AGECAT	South	2	-3.4558	0.1618	490	-21.35	<.0001
REGION*AGECAT	South	3	-3.4100	0.2102	490	-16.23	<.0001
REGION*AGECAT	South	4	-3.5292	0.1790	490	-19.71	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Chromium

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LY
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	12
Columns in Z	108
Subjects	1
Max Obs Per Subject	569
Observations Used	569
Observations Not Used	0
Total Observations	569

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1401.13838619	
1	2	1140.05303525	0.00000885
2	1	1140.05256606	0.00000000

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Chromium

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.2638
DECKID	0.04341
Stack*HANDID	0.04214
Residual	0.3390

Fit Statistics	
-2 Res Log Likelihood	1140.1
AIC (smaller is better)	1148.1
AICC (smaller is better)	1148.1
BIC (smaller is better)	1153.7

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			-3.7070	0.1668	13	-22.22	<.0001
REGION	North		0.2614	0.2141	492	1.22	0.2225
REGION	South		0	.	.	.	.
AGECAT		2	0.1683	0.1791	492	0.94	0.3479
AGECAT		3	0.03815	0.2147	492	0.18	0.8590
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	0.4471	0.2657	492	1.68	0.0931
REGION*AGECAT	North	3	0.7157	0.3033	492	2.36	0.0187
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Chromium

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	492	32.46	<.0001
AGECAT	2	492	4.99	0.0071
REGION*AGECAT	2	492	2.87	0.0577

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	-2.8301	0.1434	492	-19.73	<.0001
REGION*AGECAT	North	3	-2.6917	0.1668	492	-16.13	<.0001
REGION*AGECAT	North	4	-3.4455	0.1924	492	-17.91	<.0001
REGION*AGECAT	South	2	-3.5387	0.1525	492	-23.21	<.0001
REGION*AGECAT	South	3	-3.6688	0.1931	492	-19.00	<.0001
REGION*AGECAT	South	4	-3.7070	0.1668	492	-22.22	<.0001

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Copper

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LY
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
Stack	30	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4
HANDID	2	L R

Dimensions	
Covariance Parameters	4
Columns in X	12
Columns in Z	108
Subjects	1
Max Obs Per Subject	568
Observations Used	568
Observations Not Used	0
Total Observations	568

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Copper

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	1264.31960085	
1	2	1018.47052390	0.00155521
2	1	1018.45892902	0.00000450
3	1	1018.45889652	0.00000000

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
Stack	0.1870
DECKID	0.05048
Stack*HANDID	0.03927
Residual	0.2722

Fit Statistics	
-2 Res Log Likelihood	1018.5
AIC (smaller is better)	1026.5
AICC (smaller is better)	1026.5
BIC (smaller is better)	1032.1

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			-3.6622	0.1638	13	-22.36	<.0001
REGION	North		0.2139	0.2232	491	0.96	0.3384
REGION	South		0	.	.	.	.
AGECAT		2	0.8032	0.1868	491	4.30	<.0001
AGECAT		3	-0.08574	0.2235	491	-0.38	0.7015
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	-0.1939	0.2771	491	-0.70	0.4845
REGION*AGECAT	North	3	0.3815	0.3161	491	1.21	0.2280

MIXED MODEL ANALYSIS OF LOG(HAND)

The Mixed Procedure

ANALYTE=Copper

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	491	5.42	0.0203
AGECAT	2	491	16.68	<.0001
REGION*AGECAT	2	491	2.15	0.1171

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	-2.8390	0.1375	491	-20.64	<.0001
REGION*AGECAT	North	3	-3.1526	0.1639	491	-19.24	<.0001
REGION*AGECAT	North	4	-3.4484	0.1918	491	-17.98	<.0001
REGION*AGECAT	South	2	-2.8590	0.1479	491	-19.34	<.0001
REGION*AGECAT	South	3	-3.7480	0.1922	491	-19.50	<.0001
REGION*AGECAT	South	4	-3.6622	0.1638	491	-22.36	<.0001

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Arsenic

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LX
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South

Dimensions	
Covariance Parameters	2
Columns in X	9
Columns in Z	19
Subjects	1
Max Obs Per Subject	567
Observations Used	567
Observations Not Used	0
Total Observations	567

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	861.30851108	
1	2	724.00296054	0.00000000

Convergence criteria met.

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Arsenic

Covariance Parameter Estimates	
Cov Parm	Estimate
DECKID	0.09570
Residual	0.1810

Fit Statistics	
-2 Res Log Likelihood	724.0
AIC (smaller is better)	728.0
AICC (smaller is better)	728.0
BIC (smaller is better)	729.9

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		-0.1795	0.2256	15	-0.80	0.4386
REGION	North	0.9240	0.2817	546	3.28	0.0011
REGION	South	0	.	.	.	.
AGE		0.3052	0.1005	546	3.04	0.0025
AGE*AGE		-0.01767	0.006072	546	-2.91	0.0038
AGE*REGION	North	-0.3238	0.1147	546	-2.82	0.0049
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	0.01914	0.006639	546	2.88	0.0041
AGE*AGE*REGION	South	0	.	.	.	.

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	546	10.76	0.0011
AGE	1	546	6.25	0.0127
AGE*AGE	1	546	5.95	0.0150
AGE*REGION	1	546	7.97	0.0049
AGE*AGE*REGION	1	546	8.31	0.0041

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Arsenic

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	0.7472	0.1022	546	7.31	<.0001
REGION	South	0.3066	0.1111	546	2.76	0.0060

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Chromium

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LX
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South

Dimensions	
Covariance Parameters	2
Columns in X	9
Columns in Z	19
Subjects	1
Max Obs Per Subject	569
Observations Used	569
Observations Not Used	0
Total Observations	569

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	894.90683051	
1	2	686.88651727	0.00003737
2	1	686.87976499	0.00000014
3	1	686.87974055	0.00000000

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Chromium

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
DECKID	0.1438
Residual	0.1669

Fit Statistics	
-2 Res Log Likelihood	686.9
AIC (smaller is better)	690.9
AICC (smaller is better)	690.9
BIC (smaller is better)	692.8

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		0.09099	0.2733	16	0.33	0.7435
REGION	North	0.8528	0.3412	547	2.50	0.0127
REGION	South	0	.	.	.	.
AGE		0.2742	0.1217	547	2.25	0.0247
AGE*AGE		-0.01587	0.007352	547	-2.16	0.0314
AGE*REGION	North	-0.2637	0.1389	547	-1.90	0.0582
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	0.01566	0.008039	547	1.95	0.0519
AGE*AGE*REGION	South	0	.	.	.	.

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	547	6.25	0.0127
AGE	1	547	4.20	0.0409
AGE*AGE	1	547	3.99	0.0462

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Chromium

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
AGE*REGION	1	547	3.60	0.0582
AGE*AGE*REGION	1	547	3.80	0.0519

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	0.9939	0.1239	547	8.02	<.0001
REGION	South	0.5304	0.1344	547	3.95	<.0001

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Copper

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LX
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South

Dimensions	
Covariance Parameters	2
Columns in X	9
Columns in Z	19
Subjects	1
Max Obs Per Subject	568
Observations Used	568
Observations Not Used	0
Total Observations	568

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	816.18598504	
1	2	629.29654978	0.00000000

Convergence criteria met.

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Copper

Covariance Parameter Estimates	
Cov Parm	Estimate
DECKID	0.1091
Residual	0.1516

Fit Statistics	
-2 Res Log Likelihood	629.3
AIC (smaller is better)	633.3
AICC (smaller is better)	633.3
BIC (smaller is better)	635.2

Solution for Fixed Effects						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept		1.0218	0.2390	15	4.28	0.0007
REGION	North	-0.4092	0.2984	547	-1.37	0.1708
REGION	South	0	.	.	.	.
AGE		-0.2945	0.1064	547	-2.77	0.0058
AGE*AGE		0.01552	0.006427	547	2.41	0.0161
AGE*REGION	North	0.1948	0.1214	547	1.60	0.1093
AGE*REGION	South	0	.	.	.	.
AGE*AGE*REGION	North	-0.01081	0.007028	547	-1.54	0.1245
AGE*AGE*REGION	South	0	.	.	.	.

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	547	1.88	0.1708
AGE	1	547	10.54	0.0012
AGE*AGE	1	547	8.28	0.0042
AGE*REGION	1	547	2.57	0.1093
AGE*AGE*REGION	1	547	2.37	0.1245

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Copper

Least Squares Means						
Effect	REGION	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION	North	0.3656	0.1083	547	3.37	0.0008
REGION	South	0.4252	0.1175	547	3.62	0.0003

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Arsenic

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LX
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4

Dimensions	
Covariance Parameters	2
Columns in X	12
Columns in Z	19
Subjects	1
Max Obs Per Subject	567
Observations Used	567
Observations Not Used	0
Total Observations	567

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	841.46464338	
1	2	697.20411599	0.00000000

Convergence criteria met.

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Arsenic

Covariance Parameter Estimates	
Cov Parm	Estimate
DECKID	0.09996
Residual	0.1810

Fit Statistics	
-2 Res Log Likelihood	697.2
AIC (smaller is better)	701.2
AICC (smaller is better)	701.2
BIC (smaller is better)	703.1

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			0.4222	0.1879	13	2.25	0.0427
REGION	North		0.4231	0.2972	548	1.42	0.1551
REGION	South		0	.	.	.	.
AGECAT		2	-0.3052	0.2486	548	-1.23	0.2202
AGECAT		3	0.5357	0.2974	548	1.80	0.0723
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	0.1480	0.3688	548	0.40	0.6884
REGION*AGECAT	North	3	-0.5864	0.4205	548	-1.39	0.1637
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Arsenic

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	548	3.07	0.0801
AGECAT	2	548	3.36	0.0353
REGION*AGECAT	2	548	2.03	0.1324

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	0.6881	0.1457	548	4.72	<.0001
REGION*AGECAT	North	3	0.7945	0.1880	548	4.23	<.0001
REGION*AGECAT	North	4	0.8453	0.2302	548	3.67	0.0003
REGION*AGECAT	South	2	0.1170	0.1628	548	0.72	0.4726
REGION*AGECAT	South	3	0.9578	0.2306	548	4.15	<.0001
REGION*AGECAT	South	4	0.4222	0.1879	548	2.25	0.0251

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Chromium

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LX
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4

Dimensions	
Covariance Parameters	2
Columns in X	12
Columns in Z	19
Subjects	1
Max Obs Per Subject	569
Observations Used	569
Observations Not Used	0
Total Observations	569

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	863.05813170	
1	2	659.14899797	0.00001726
2	1	659.14566612	0.00000003
3	1	659.14565993	0.00000000

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Chromium

Convergence criteria met.

Covariance Parameter Estimates	
Cov Parm	Estimate
DECKID	0.1391
Residual	0.1669

Fit Statistics	
-2 Res Log Likelihood	659.1
AIC (smaller is better)	663.1
AICC (smaller is better)	663.2
BIC (smaller is better)	665.0

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			0.6317	0.2196	13	2.88	0.0130
REGION	North		0.3201	0.3472	550	0.92	0.3571
REGION	South		0	.	.	.	.
AGECAT		2	-0.2670	0.2905	550	-0.92	0.3585
AGECAT		3	0.4690	0.3474	550	1.35	0.1776
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	0.2163	0.4309	550	0.50	0.6159
REGION*AGECAT	North	3	-0.2562	0.4912	550	-0.52	0.6021
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Chromium

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	550	2.76	0.0970
AGECAT	2	550	2.69	0.0687
REGION*AGECAT	2	550	0.61	0.5445

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	0.9011	0.1702	550	5.29	<.0001
REGION*AGECAT	North	3	1.1645	0.2196	550	5.30	<.0001
REGION*AGECAT	North	4	0.9517	0.2690	550	3.54	0.0004
REGION*AGECAT	South	2	0.3647	0.1902	550	1.92	0.0557
REGION*AGECAT	South	3	1.1007	0.2692	550	4.09	<.0001
REGION*AGECAT	South	4	0.6317	0.2196	550	2.88	0.0042

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Copper

Model Information	
Data Set	WORK.ZZZ
Dependent Variable	LX
Covariance Structure	Variance Components
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Containment

Class Level Information		
Class	Levels	Values
DECKID	19	FLAA FLAC FLS FLT FLU FLV FLW FLY FLZ PAH PAI PAK PAL PAM PAN PAP PAQ PAR PAX
REGION	2	North South
AGECAT	3	2 3 4

Dimensions	
Covariance Parameters	2
Columns in X	12
Columns in Z	19
Subjects	1
Max Obs Per Subject	568
Observations Used	568
Observations Not Used	0
Total Observations	568

Iteration History			
Iteration	Evaluations	-2 Res Log Like	Criterion
0	1	792.17015094	
1	2	602.18596569	0.00000000

Convergence criteria met.

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Copper

Covariance Parameter Estimates	
Cov Parm	Estimate
DECKID	0.1110
Residual	0.1516

Fit Statistics	
-2 Res Log Likelihood	602.2
AIC (smaller is better)	606.2
AICC (smaller is better)	606.2
BIC (smaller is better)	608.1

Solution for Fixed Effects							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
Intercept			0.09328	0.1966	13	0.47	0.6431
REGION	North		0.3292	0.3109	549	1.06	0.2902
REGION	South		0	.	.	.	.
AGECAT		2	0.6505	0.2601	549	2.50	0.0127
AGECAT		3	-0.2313	0.3110	549	-0.74	0.4574
AGECAT		4	0	.	.	.	.
REGION*AGECAT	North	2	-0.5434	0.3859	549	-1.41	0.1597
REGION*AGECAT	North	3	-0.03637	0.4398	549	-0.08	0.9341
REGION*AGECAT	North	4	0	.	.	.	.
REGION*AGECAT	South	2	0	.	.	.	.
REGION*AGECAT	South	3	0	.	.	.	.
REGION*AGECAT	South	4	0	.	.	.	.

MIXED MODEL ANALYSIS OF LOG(BLOCK)

The Mixed Procedure

ANALYTE=Copper

Type 3 Tests of Fixed Effects				
Effect	Num DF	Den DF	F Value	Pr > F
REGION	1	549	0.68	0.4110
AGECAT	2	549	5.68	0.0036
REGION*AGECAT	2	549	1.37	0.2539

Least Squares Means							
Effect	REGION	AGECAT	Estimate	Standard Error	DF	t Value	Pr > |t|
REGION*AGECAT	North	2	0.5296	0.1524	549	3.48	0.0006
REGION*AGECAT	North	3	0.1548	0.1967	549	0.79	0.4317
REGION*AGECAT	North	4	0.4225	0.2409	549	1.75	0.0800
REGION*AGECAT	South	2	0.7438	0.1703	549	4.37	<.0001
REGION*AGECAT	South	3	-0.1380	0.2410	549	-0.57	0.5670
REGION*AGECAT	South	4	0.09328	0.1966	549	0.47	0.6354