

SDHRM

Example Homework 3

Part A: Ecologic Data

Hypothesis: compared with men, women have higher systolic blood pressure

Study design: cross-sectional

Variables:

Variable	Label	N	Minimum	Median	Maximum
male	male sex	5701	0.00	0.00	1.00
agebl	calculated age at baseline	5701	63.00	72.00	100.00
white	white race	5701	0.00	1.00	1.00
bpbl	doctor told you had high blood pressure	5701	0.00	0.00	1.00
bmi	body mass index	5701	14.68	26.15	58.91
alcohbl	total alcohol per wk	5701	0.00	0.00	85.00
married	married	5701	0.00	1.00	1.00
sysbl	systolic blood pressure	5701	77.00	134.00	234.77
male_tract	proportion male at tract level	1098	0.00	0.33	1.00
agebl_tract	mean age at tract level	1098	65.00	73.00	95.00
white_tract	proportion white at tract level	1098	0.00	1.00	1.00
married_tract	proportion married at tract level	1098	0.00	0.67	1.00
sysbl_tract	mean systolic BP at tract level	1098	82.00	136.00	230.00
male_zip	proportion male at zip level	440	0.00	0.39	1.00
agebl_zip	mean age at zip level	440	65.00	73.00	95.00
white_zip	proportion white at zip level	440	0.00	1.00	1.00
married_zip	proportion married at zip level	440	0.00	0.75	1.00
sysbl_zip	mean systolic BP at zip level	440	98.00	136.00	194.00

Best individual level model:

The REG Procedure
Dependent Variable: avesysbl systolic blood pressure

Number of Observations Read 5701
Number of Observations Used 5701

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	135529	33882	75.06	<.0001
Error	5696	2571299	451.42187		
Corrected Total	5700	2706828			

Root MSE 21.24669 R-Square 0.0501
Dependent Mean 136.35119 Adj R-Sq 0.0494
Coeff Var 15.58233

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	87.57276	3.87237	22.61	<.0001
male	male sex	1	-1.75420	0.60238	-2.91	0.0036
agebl	calculated age at baseline	1	0.75229	0.05159	14.58	<.0001
white	white race	1	-6.36282	0.77422	-8.22	<.0001
married	married	1	0.12045	0.65047	0.19	0.8531

Best tract-level model:

The REG Procedure

Dependent Variable: sysbl_tract mean systolic BP at tract level

Number of Observations Read 1098
 Number of Observations Used 1098

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	25177	6294.18463	20.04	<.0001
Error	1093	343343	314.12937		
Corrected Total	1097	368520			

Root MSE 17.72370 R-Square 0.0683
 Dependent Mean 137.41431 Adj R-Sq 0.0649
 Coeff Var 12.89800

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	89.73992	7.71131	11.64	<.0001
male_tract	proportion male at tract level	1	-4.02371	1.48350	-2.71	0.0068
agebl_tract	mean age at tract level	1	0.73307	0.10210	7.18	<.0001
white_tract	proportion white at tract level	1	-6.34914	1.46128	-4.34	<.0001
married_tract	proportion married at tract level	1	0.25993	1.34110	0.19	0.8464

Best zip-level model:

The REG Procedure

Dependent Variable: sysbl_zip mean systolic BP at zip level

Number of Observations Read 440
 Number of Observations Used 440

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	9548.48496	2387.12124	8.31	<.0001
Error	435	124976	287.30164		
Corrected Total	439	134525			

Root MSE 16.94997 R-Square 0.0710
 Dependent Mean 136.99798 Adj R-Sq 0.0624
 Coeff Var 12.37243

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	95.70784	12.08867	7.92	<.0001
male_zip	proportion male at zip level	1	-3.00552	2.24386	-1.34	0.1811
agebl_zip	mean age at zip level	1	0.66545	0.15477	4.30	<.0001
white_zip	proportion white at zip level	1	-7.91436	2.68475	-2.95	0.0034
married_zip	proportion married zip level	1	-0.01127	2.00288	-0.01	0.9955

Part B: Multilevel Data

Aims: Explore the association between social network score and self-reported depression symptoms after adjusting for poor health and other potential confounders

Study design: Cross-sectional study of 5267 elderly adults living in 1019 unique census tracts located within 4 counties

Variable	Label	N	Min	Median	Max
depscrbl	depression scale total	5267	0.00	3.00	29.00
netscrbl	social network score	5267	1.00	34.00	50.00
netscrbl_balanced	social network score minus on tract level mean	5267	25.62	0.00	18.25
netscrbl_tract	mean social network score at tract level	5267	1.00	34.07	48.89
male	male sex	5267	0.00	0.00	1.00
agebl	calculated age at baseline	5267	63.00	71.00	100.00
white	white race	5267	0.00	1.00	1.00
married	married	5267	0.00	1.00	1.00
poorhealth	poor health	5267	0.00	0.00	1.00
poorhealth_tract	proportion with poor health at tract level	5267	0.00	0.20	1.00

The REG Procedure
 Model: MODEL1
 Dependent Variable: depscrbl depression scale total

Number of Observations Read 5267
 Number of Observations Used 5267

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	14320	1789.97942	101.51	<.0001
Error	5258	92714	17.63286		
Corrected Total	5266	107033			

Root MSE 4.19915 R-Square 0.1338
 Dependent Mean 4.63143 Adj R-Sq 0.1325
 Coeff Var 90.66647

Parameter Estimates

Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	Intercept	1	6.80034	1.00363	6.78	<.0001
netscrbl	social network score	1	-0.08227	0.01105	-7.44	<.0001
netscrbl_tract	mean social network score at tract level	1	0.01881	0.01935	0.97	0.3309
agebl	calculated age at baseline	1	0.00431	0.01092	0.39	0.6931
male	male sex	1	-1.09902	0.12476	-8.81	<.0001
white	white race	1	-0.46910	0.16623	-2.82	0.0048
married	married	1	-0.46933	0.14227	-3.30	0.0010
poorhealth	poor health	1	2.69378	0.15602	17.27	<.0001
poorhealth_tract	proportion with poor health at	1	0.60332	0.31866	1.89	0.0584
Mean-balancing individual level (all other parameters unchanged):						
netscrbl_balanced	social network score minus tract level mean	1	-0.08227	0.01105	-7.44	<.0001
netscrbl_tract	mean social network score at tract level	1	-0.06346	0.01647	-3.85	0.0001

The Mixed Procedure
Model Information

Data Set WORK.PERSON_TRACT
 Dependent Variable depscrbl
 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
 clinic 4 3 4 5 6
 tract_unique_char 1019 147500003 202101408 263200048 [. . .]
 9960300017

Number of Observations
 Number of Observations Read 5267
 Number of Observations Used 5267
 Number of Observations Not Used 0

Covariance Parameter Estimates

Cov Parm	Estimate
clinic	0.1974
tract_unique_char	0.1696
Residual	17.3525

Solution for Fixed Effects

Effect	Estimate	Standard Error	DF	t Value	Pr > t
Intercept	8.3299	1.0665	3	7.81	0.0044
netscrbl	-0.08344	0.01097	4242	-7.60	<.0001
netscrbl_tract	-0.02163	0.02071	4242	-1.04	0.2964
agebl	0.00253	0.01093	4242	0.23	0.8165
male	-1.1231	0.1241	4242	-9.05	<.0001
white	-0.4707	0.1763	4242	-2.67	0.0076
married	-0.4156	0.1423	4242	-2.92	0.0035
poorhealth	2.6947	0.1548	4242	17.41	<.0001
poorhealth_tract	0.6354	0.3255	4242	1.95	0.0510

Mean-balancing individual level (all other parameters unchanged):

netscrbl_balanced	-0.08344	0.01097	4242	-7.60	<.0001
netscrbl_tract	-0.1051	0.01818	4242	-5.78	<.0001