STAT 506 - Problem Set 1

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Notes: scripts and well formatted markdown files can be downloaded on my github repo/.

Problem1

a. Converting between long and wide data formats

The corresponding file and websites are **ProblemSet1_1(a).do** and https://stats.idre.ucla.edu/stata/modules/ and https://stats.idre.ucla.edu/stat/stata/modules/kids , https://stats.idre.ucla.edu/stat/stata/modules/dadmomw.

b. Stata example 1

The corresponding file and websites are **ProblemSet1_1(b).do** and https://stats.idre.ucla.edu/other/dae/.

c. Stata example 2 The corresponding file and websites are **ProblemSet1_1(c).do** and https://stats.idre.ucla.edu/other/dae/.

Problem2

The corresponding file and websites are **ProblemSet1_2.do** and http://www.eia.gov/consumption/residential/data/2009/.

a.

reportable~n represents state and rate represents proportion of wood shingle roofs.

. list reportable~n rate if rooftype==2

	report~n	rate
67.	19	.0144062
81.	4	.0244547
84.	8	.0284647
86.	20	.0299494
87.	13	.0319221
88.	18	.0324584
89.	9	.0332125
92.	6	.0343415
96.	3	.0395206
97.	10	.039543
98.	1	.0398771
101.	11	.0450165
102.	2	.0478129
103.	24	.0511356
104.	12	.0521929
107.	14	.0551071
108.	15	.0573164
111.	7	.0592537
112.	5	.059617
113.	27	.0596553
117.	17	.0679545
122.	21	.0774461
127.	26	.0840876
130.	22	.0911869
131.	23	.092559
135.	25	.0981669
150.	16	.1246495

The max value is .1246495 and report~n is 16, the min value is .0144062 and reportable~n is 19. According to the codebook, the answer 1 is North Carolina, South Carolina, the answer 2 is Tennessee.

b.

A part of the table is shown below, which is the proportion of each roof type for all houses constructed in each decade. rate represents the proportion of each roof type for all houses constructed in each decade.

. list

	rooftype	decades	nweight	ss	rate	
1.	4	1	459060.4	1.96e+07	.0233793	
2.	2	1	988783.7	1.96e+07	.0503573	

-2						
5 1 9124287 1.96e+07 .4646863 3 1 1160610 1.96e+07 .0591081 8 1 400711.5 1.96e+07 .0204076 6 1 4516175 1.96e+07 .230002 7 1 66513.79 1.96e+07 .0033874 5 2 7507134 1.35e+07 .0075852 6 2 2625692 1.35e+07 .0075852 6 2 2625692 1.35e+07 .0122376 -2 2 1279565 1.35e+07 .0122376 -2 2 1279565 1.35e+07 .01944621 1 2 129341.6 1.35e+07 .0410991 4 2 194246.4 1.35e+07 .0410991 4 2 194246.4 1.35e+07 .0163117 3 3 672852.3 1.33e+07 .016053 4 3 144047.2 1.33e+07 .0108053 -2 <td>3.</td> <td>1</td> <td>1</td> <td>195408.4</td> <td>1.96e+07</td> <td>.0099519</td>	3.	1	1	195408.4	1.96e+07	.0099519
3 1 1160610 1.96e+07 .0591081 8 1 400711.5 1.96e+07 .0204076 6 1 4516175 1.96e+07 .230002 7 1 66513.79 1.96e+07 .0033874 5 2 7507134 1.35e+07 .0033874 5 2 7507134 1.35e+07 .0075852 6 2 2625692 1.35e+07 .1938381 8 2 165768 1.35e+07 .0122376 -2 2 1279565 1.35e+07 .0122376 -2 2 1279565 1.35e+07 .0944621 1 2 129341.6 1.35e+07 .0075852 3 2 556720 1.35e+07 .0410991 4 2 194246.4 1.35e+07 .01434 1 3 216477.3 1.33e+07 .0163117 3 3 672852.3 1.33e+07 .0506997 8 3 144047.2 1.33e+07 .0506997 8 3 144047.2 1.33e+07 .010854 4 3 143400.5 1.33e+07 .0108053 -2 3 2565420 1.33e+07 .0108053 -2 3 380897.6 1.33e+07 .056376 5 3 6308142 1.33e+07 .056376 5 3 6308142 1.33e+07 .05059041 1 4 49815 1.83e+07 .0055934 1 4 407987.8 1.83e+07 .0599041 1 4 449815 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 4 7943300 1.83e+07 .024593 5 5 7023901 1.70e+07 .024593 7 5 194046.4 1.70e+07 .0114342 4 241359.4 1.83e+07 .014342 4 5 161064.5 1.70e+07 .014342 4 5 161064.5 1.70e+07 .014342 5 161064.5 1.70e+07 .0398188 8 5 88979.02 1.70e+07 .0392431 6 5 2344584 1.70e+07 .0398188 8 5 88979.02 1.70e+07 .0398188 8 5 88979.02 1.70e+07 .0398188 8 5 88979.02 1.70e+07 .0398188	4.	-2	1	2723822	1.96e+07	.1387202
8	5.	5	1	9124287	1.96e+07	.4646863
6	6.	3	1	1160610	1.96e+07	.0591081
7 1 66513.79 1.96e+07 .0033874 5 2 7507134 1.35e+07 .0542037 7 2 102747.1 1.35e+07 .0075852 6 2 2625692 1.35e+07 .1938381 8 2 165768 1.35e+07 .0122376 -2 2 1279555 1.35e+07 .0122376 -2 2 129341.6 1.35e+07 .0944621 1 2 129341.6 1.35e+07 .0095485 2 2 984588.5 1.35e+07 .0726859 3 2 556720 1.35e+07 .0140991 4 2 194246.4 1.35e+07 .01434 1 3 216477.3 1.33e+07 .0160813 1 3 14477.3 1.33e+07 .0160853 4 3 143400.5 1.33e+07 .010854 4 3 143400.5 1.33e+07 .0166376 5	7.	8	1	400711.5	1.96e+07	.0204076
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8 5 88979.02 1.70e+07 .0052431 6 5 2344584 1.70e+07 .1381544 3 5 1857067 1.70e+07 .1094275 2 5 1130937 1.70e+07 .0666404 6 6 2259867 1.64e+07 .138217	٠.	4	5	161064.5	1.70e+07	.0094907
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	· ·					
	6.	6	6	2259867	1.64e+07	.138917
3 1000012 1.046707 .0979002	7.					
	•	3	0	1000012	1.046707	.0313002

48 | _2 6 2/00773 1 6/6±07 15280 |

For full table, please execute the script.

The following table includes relrate (rate in the picture) representing relative rise between 1950 and 2000.

. list rooftype rate

	rooftype	rate
1. 2. 3.	4 8 6 5	1.616363 1.797576 2.657586 4.003606
5.	2	4.791831
6. 7. 8. 9.	-2 3 1 7	5.122133 5.634457 12.22678 12.25835

Use this subset by decades to calculate, Concrete Tiles roof saw the largest relative rise.

Problem3

The corresponding file and websites are **ProblemSet1_3.do**, **AUX_D.DTA**, **DEMO_D.DTA** and https://wwwn.cdc.gov/nchs/nhanes/search/datapage.aspx?Component=Examination&CycleBeginYear=2005 and https://wwwn.cdc.gov/Nchs/Nhanes/Search/DataPage.aspx? Component=Demographics&CycleBeginYear=2005.

a.

By using command option, I can drop unnecessary cases.

b.

Above all, I replace AUXU* with log(AUXU*), because when decibel increases by 10db, volume increases by 10 times.

Compare each frequency separately and only need to use the first test at each frequency. Here is just an example.

. summarize AUXU1K1R

Variable	Obs	Mean	Std. Dev.	Min	Max
AUXU1K1R	2,746	2.926309	.7468581	0	6.801283

Use t test to examine it.

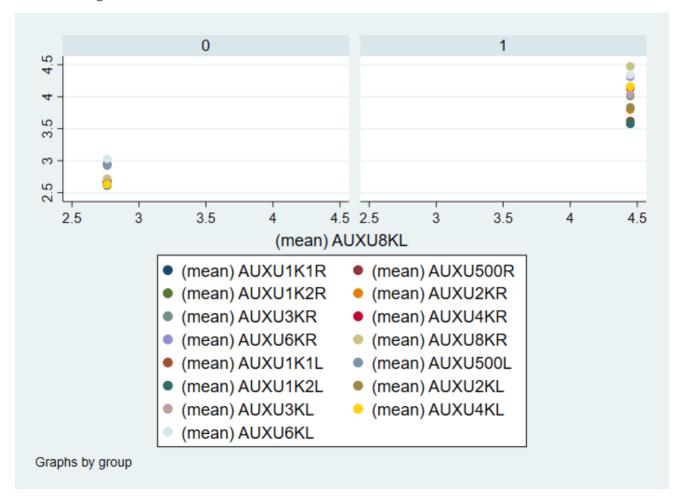
. ttest AUXU1K1R, by(group)

Two-sample t test with equal variances

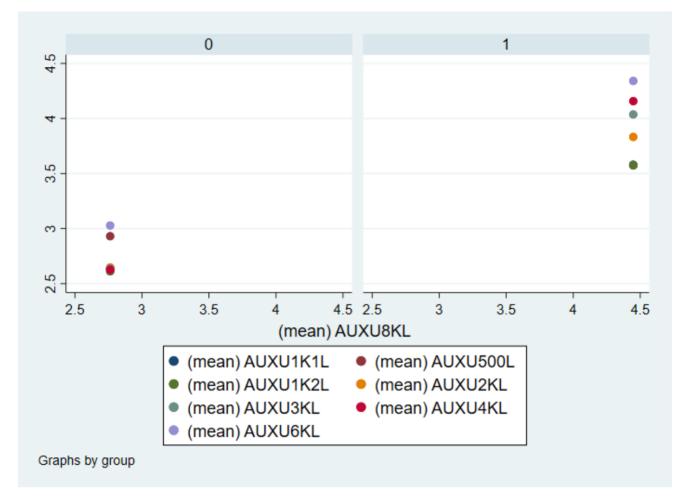
Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	2,016 730	2.675796 3.618138	.0144154 .0199162		2.647525 3.579038	2.704066 3.657238
combined	2,746	2.926309	.0142524	.7468581	2.898363	2.954256
diff		942342	.0267872		9948671	889817
diff = mean(0) - mean(1) $t = -35.1789$ Ho: diff = 0 degrees of freedom = 2744						
	iff < 0) = 0.0000	Pr(Ha: diff !=			liff > 0 :) = 1.0000

Based on data, hearing loss due to age is common at each frequency because the two-sample t tests reject the null hypothesis: diff=0. Besides, neither ear is more prone to hearing loss.

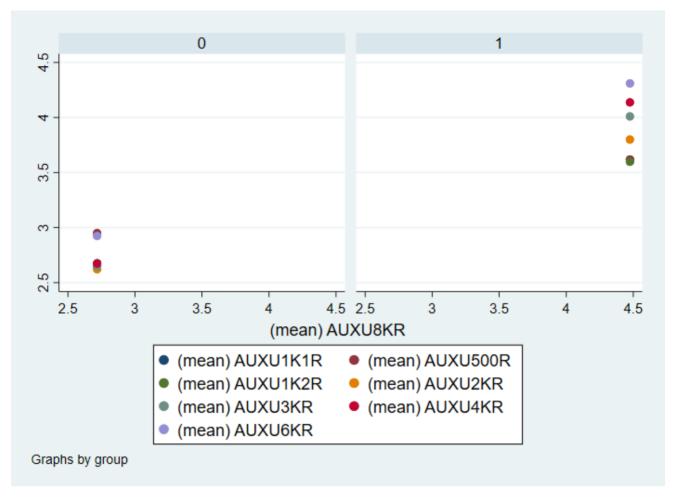
For left and right ears:



For the left ear:



For the right ear:

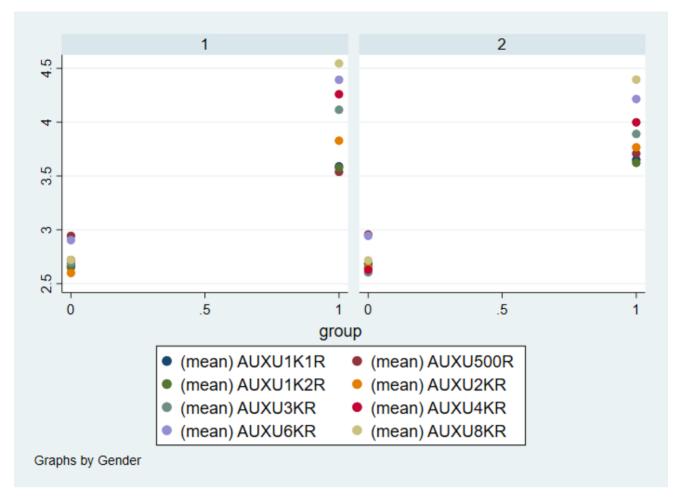


There are no distinct differences between pictures, so I think left ear tests and right ear tests have the same results.

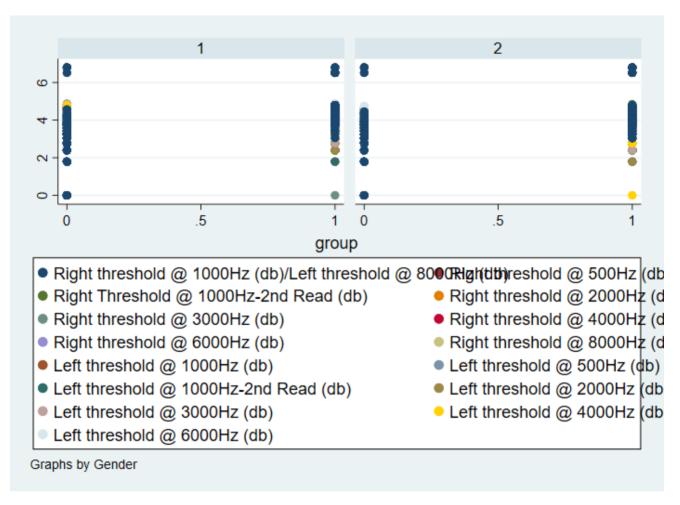
Furthermore, it can be verified by t test. For example, examine differences of left and right ear threshold by group, the null hypothesis cannot be rejected.

c.

For right ear, plot a graph about mean:



And plot a graph about all data:



Neither gender is more prone to age-related hearing loss.