

Supplementary Tutorial
Duricki, Soleman and Moon (2016)

A click-by-click guide to analysing longitudinal data from animals where some data are missing.

Slides 1 to 31) How to enter and explore data graphically.

Slides 32 to 45) Analysis using RM ANCOVA.

Slides 46 to 74) Analysis using linear models with general covariance structures.

Slides 75 to 82) Restructuring data.

Supplementary Tutorial, Slide 1: Loading data. Click “Cancel”.

The screenshot shows the PASW Statistics 18 Data Editor interface. The main window displays a grid with 25 rows and 4 columns labeled 'var'. A dialog box titled 'PASW Statistics 18' is open in the center, asking 'What would you like to do?'. The dialog has several options:

- Open an existing data source:
 - More Files... (list of files)
- Open another type of file:
 - More Files... (empty list)
- Run the tutorial
- Type in data
- Run an existing query
- Create new query using Database Wizard

At the bottom of the dialog, there is a checkbox for 'Don't show this dialog in the future' and 'OK' and 'Cancel' buttons. The task instruction is to click 'Cancel'.

Windows taskbar at the bottom shows the Start button, taskbar icons for Windows Explorer, Firefox, and several instances of Microsoft Word and PASW Statistics 18. The system tray shows the time as 19:51.

Supplementary Tutorial, Slide 2: Loading data. Click File>Open>Data.

The screenshot shows the PASW Statistics Data Editor interface. The title bar reads "Untitled1 [DataSet0] - PASW Statistics Data Editor". The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Window, and Help. The File menu is open, and the "Open" option is selected, which has opened a sub-menu. In this sub-menu, the "Data..." option is highlighted. The main workspace is a grid with 13 columns labeled "var" and 25 rows. The status bar at the bottom right indicates "Visible: 0 of 0 Variables". The Windows taskbar at the bottom shows the Start button and several open applications: Screen shots, Duricki Gri..., 2 Micros..., 4 Adobe..., EndNote X..., 3 Micros..., Statistics ..., and Untitled1 [...]. The system clock shows 18:16.

Supplementary Tutorial, Slide 3: Navigate to “short_format” data file.
You need to have downloaded this from the Nature Protocols website (Supplementary Data 1) or from www.lawrencemoon.co.uk/resources/linearmodels.asp

The screenshot displays the PASW Statistics Data Editor interface. The main window shows a grid with 25 rows and 16 columns, all labeled 'var'. An 'Open Data' dialog box is open in the center, showing the 'Look in' directory as 'SPSS files'. The file list contains 'long_format.sav' and 'short_format.sav', with 'short_format.sav' selected. The 'File name' field contains 'short_format.sav', and the 'Files of type' dropdown is set to 'PASW Statistics (*.sav)'. The 'Open' button is highlighted. The status bar at the bottom indicates 'PASW Statistics Processor is ready' and shows the system tray with the time 10:08.

Untitled2 [DataSet1] - PASW Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

Visible: 0 of 0 Variables

Look in: SPSS files

- long_format.sav
- short_format.sav

File name: short_format.sav

Files of type: PASW Statistics (*.sav)

Minimize string widths based on observed values

Open Paste Cancel

Data View Variable View

Data... PASW Statistics Processor is ready 10:08

Supplementary Tutorial, Slide 4: Data View

Click on the “A1” icon (green circle) to toggle between label names and label numbers.

The screenshot shows the SPSS Data View interface. The toolbar at the top contains various icons, with the 'A1' icon (a small 'A' over a '1') circled in green. A tooltip labeled 'Value Labels' is visible over this icon. The data table below has columns for 'rat', 'Adult_vs_Aged', 'injury', 'group', and eight 'mean_postop' variables, plus a 'var' column. The 'rat' column contains values from 1 to 25, and the 'Adult_vs_Aged' column contains 'Adult' or 'Aged'. The 'injury' column contains 'Stroke' or 'Sham'. The 'group' column contains 'Adult AAV-NT3' or 'Aged AAV-NT3' or 'Aged AAV-GFP'. The 'mean_postop' columns contain numerical values ranging from 0 to 0.50. The 'var' column is empty. The status bar at the bottom indicates 'PASW Statistics Processor is ready'.

rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop_1	mean_postop_2	mean_postop_3	mean_postop_4	mean_postop_5	mean_postop_6	mean_postop_7	mean_postop_8	var
1	1	Adult	Stroke	Adult AAV-NT3	.0	.18	.16	.10	.07	.03	.06	.03	.03
2	2	Adult	Sham	Sham	.10	.09	.07	.06	.07	.03	.10	.07	.10
3	3	Adult	Sham	Sham	.06	.03	.06	.10	.03	.03	.0	.03	.0
4	4	Adult	Stroke	Adult AAV-NT3	.0	.25	.13	.13	.13	.03	.10	.03	.09
5	5	Adult	Stroke	Adult AAV-NT3	.0	.21	.09	.10	.14	.03	.10	.03	.09
6	6	Adult	Stroke	Adult AAV-NT3	.0	.20	.10	.13	.10	.03	.0	.13	.0
7	7	Adult	Stroke	Adult AAV-NT3	.0	.28	.25	.13	.07	.07	.06	.09	.13
8	8	Adult	Stroke	Adult AAV-NT3	.03	.21	.24	.03	.13	.10	.10	.10	.03
9	9	Adult	Stroke	Adult AAV-NT3	.07	.37	.09	.06	.07	.03	.12	.03	.0
10	10	Adult	Stroke	Adult AAV-NT3	.14	.14	.16	.14	.18	.13	.10	.14	.03
11	11	Adult	Stroke	Adult AAV-NT3	.0	.29	.06	.03	.14	.06	.03	.14	.0
12	12	Adult	Stroke	Adult AAV-NT3	.03	.07	.10	.14	.08	.10	.06	.03	.03
13	13	Adult	Stroke	Adult AAV-NT3	.13	.32	.13	.16	.21	.17	.0	.09	.0
14	14	Adult	Stroke	Adult AAV-NT3	.0	.23	.13	.06	.13	.10	.03	.10	.03
15	15	Adult	Sham	Sham	.03	.14	.10	.03	.07	.14	.07	.10	.03
16	16	Adult	Stroke	Adult AAV-NT3	.03	.19	.0	.20	.03	.13	.06	.03	.0
17	17	Adult	Stroke	Adult AAV-NT3	.13	.20	.0	.06	.10	.0	.10	.10	.03
18	18	Adult	Stroke	Adult AAV-NT3	.06	.44	.16	.14	.14	.07	.03	.12	.16
19	19	Aged	Stroke	Aged AAV-NT3	.04	.26	.17	.19	.25	.20	.50	.13	.10
20	21	Aged	Stroke	Aged AAV-NT3	.13	.42	.46	.46	.37	.42	.46	.30	.26
21	22	Aged	Stroke	Aged AAV-NT3	.10	.26	.10	.22	.11	.18	.10	.06	.13
22	23	Aged	Stroke	Aged AAV-NT3	.10	.20	.15	.13	.13	.07	.17	.10	.23
23	24	Aged	Stroke	Aged AAV-GFP	.03	.20	.33	.30	.29	.14	.10	.13	.39
24	25	Aged	Stroke	Aged AAV-NT3	.03	.20	.38	.03	.13	.0	.10	.21	.24

Supplementary Tutorial, Slide 5

In Variable View, click on Blue icon (“...” in green circle) to discover the names of the Levels for the Factor “group”. Missing values have been coded “999.00”

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	rat	Numeric	8	0		None	None	4	Right	Nominal	Input
2	Adult_vs_Aged	Numeric	8	2		{1.00, Adult}...	None	9	Right	Nominal	Input
3	injury	Numeric	8	0		{1, Sham}...	None	8	Right	Nominal	Input
4	group	Numeric	8	2		{1.00, Aged AAV-NT3}...	None	11	Right	Nominal	Input
5	mean_preop	Numeric	8	2		None	None	8	Right	Scale	Input
6	mean_postop1	Numeric	8	2		None	None	8	Right	Scale	Input
7	mean_postop2	Numeric	8	2		None	999.00	8	Right	Scale	Input
8	mean_postop3	Numeric	8	2		None	999.00	8	Right	Scale	Input
9	mean_postop4	Numeric	8	2		None	999.00	8	Right	Scale	Input
10	mean_postop5	Numeric	8	2		None	999.00	8	Right	Scale	Input
11	mean_postop6	Numeric	8	2		None	999.00	8	Right	Scale	Input
12	mean_postop7	Numeric	8	2		None	999.00	8	Right	Scale	Input
13	mean_postop8	Numeric	8	2		None	999.00	8	Right	Scale	Input
14											
15											
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26											

Supplementary Tutorial, Slide 6: Variable View showing four Levels for "group" Factor

The screenshot displays the SPSS Variable View interface. The 'group' variable is highlighted in the list, showing it is a numeric variable with a width of 8 and 2 decimal places. The 'Value Labels' dialog box is open, showing the following definitions:

Value	Label
1.00	"Aged AAV-NT3"
2.00	"Aged AAV-GFP"
3.00	"Adult AAV-NT3"
4.00	"Sham"

The dialog box also includes fields for 'Value' and 'Label', an 'Add' button, a 'Change' button, a 'Remove' button, and a 'Spelling...' button. The 'OK', 'Cancel', and 'Help' buttons are at the bottom.

The Variable View table below shows the following data:

Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	rat	Numeric	8	0	None	None	4	Right	Nominal	Input
2	Adult_vs_Aged	Numeric	8	2	{1.00, Adult}...	None	9	Right	Nominal	Input
3	injury	Numeric	8	0	{1, Sham}...	None	8	Right	Nominal	Input
4	group	Numeric	8	2	{1.00, Aged AAV-NT3}...	None	11	Right	Nominal	Input
5	mean_preop	Numeric	8	2	None	None	8	Right	Scale	Input
6	mean_postop1	Numeric	8	2	None	None	8	Right	Scale	Input
7	mean_postop2	Numeric	8	2	None	None	8	Right	Scale	Input
8	mean_postop3	Numeric	8	2	None	None	8	Right	Scale	Input
9	mean_postop4	Numeric	8	2	None	None	8	Right	Scale	Input
10	mean_postop5	Numeric	8	2	None	None	8	Right	Scale	Input
11	mean_postop6	Numeric	8	2	None	None	8	Right	Scale	Input
12	mean_postop7	Numeric	8	2	None	None	8	Right	Scale	Input
13	mean_postop8	Numeric	8	2	None	None	8	Right	Scale	Input

Supplementary Tutorial, Slide 7 and Figure 2: Data View

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1 : rat 1 Visible: 13 of 13 Variables

	rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop 1	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
24	25	Aged	Stroke	Aged AAV-NT3	.03	.20	.38	.03	.13	.0	.10	.21	.24	
25	26	Aged	Stroke	Aged AAV-NT3	.0	.40	.23	.14	.26	.15	.09	.21	.30	
26	27	Aged	Stroke	Aged AAV-GFP	.06	.33	.13	.06	.17	.36	.06	.19	.45	
27	28	Aged	Stroke	Aged AAV-NT3	.13	.26	.20	.22	.22	.22	.12	.10	.10	
28	29	Aged	Stroke	Aged AAV-NT3	.03	.47	.20	.23	.20	.16	.06	999.00	999.00	
29	30	Aged	Stroke	Aged AAV-NT3	.0	.15	.17	.10	.03	.15	.13	.13	.00	
30	31	Aged	Stroke	Aged AAV-NT3	.06	.25	.20	.35	.20	.34	.05	.21	.20	
31	32	Aged	Stroke	Aged AAV-GFP	.03	.40	.33	.13	.30	.28	.23	.17	.48	
32	33	Aged	Stroke	Aged AAV-GFP	.17	.33	.22	.26	.33	.40	.38	999.00	999.00	
33	34	Aged	Stroke	Aged AAV-NT3	.07	.40	.30	.20	.18	.12	.13	.12	.06	
34	35	Aged	Stroke	Aged AAV-NT3	.03	.37	.23	.33	.27	.03	.20	.27	.06	
35	36	Aged	Stroke	Aged AAV-GFP	.11	.43	.40	.33	.07	.20	.16	.24	.47	
36	37	Aged	Stroke	Aged AAV-NT3	.0	.30	.30	.16	.27	.06	.26	.16	.05	
37	39	Aged	Stroke	Aged AAV-GFP	.03	.30	.19	.26	.22	.14	.17	.33	.43	
38	40	Aged	Stroke	Aged AAV-GFP	.03	.34	.20	.13	.09	.10	.24	.17	.06	
39	41	Aged	Stroke	Aged AAV-NT3	.09	.36	.24	.17	.22	.10	.20	.03	.06	
40	42	Aged	Stroke	Aged AAV-NT3	.0	.40	.42	.13	.30	.39	.27	.23	.23	
41	43	Aged	Stroke	Aged AAV-GFP	.0	.30	.45	.43	.17	.40	.36	.13	.37	
42	44	Aged	Stroke	Aged AAV-GFP	.0	.56	.53	.35	.51	.30	.25	.39	.30	
43	45	Aged	Stroke	Aged AAV-GFP	.10	.50	.13	.14	.25	.20	.23	.09	.26	
44	46	Aged	Stroke	Aged AAV-GFP	.02	.22	.29	.10	.20	.0	.10	.23	.03	
45	47	Aged	Stroke	Aged AAV-NT3	.03	.30	.30	.55	.48	.32	.15	.05	.25	
46	48	Aged	Stroke	Aged AAV-NT3	.06	.41	.50	.53	.0	.14	.06	.28	.33	
47	49	Aged	Stroke	Aged AAV-NT3	.0	.42	.21	.30	.10	.35	.24	.13	.08	

Data View Variable View

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 8 and Figure 3: Data View of “long_format” data (“long_format.sav” data file from Supplementary Data 1) suitable for analysis using the Mixed Model>Linear procedure

Visible: 7 of 7 Variables

	rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	var	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18							
2	1	Adult	Stroke	Young-NT3	.0	2	.16							
3	1	Adult	Stroke	Young-NT3	.0	3	.10							
4	1	Adult	Stroke	Young-NT3	.0	4	.07							
5	1	Adult	Stroke	Young-NT3	.0	5	.03							
6	1	Adult	Stroke	Young-NT3	.0	6	.06							
7	1	Adult	Stroke	Young-NT3	.0	7	.03							
8	1	Adult	Stroke	Young-NT3	.0	8	.03							
9	2	Adult	Sham	Sham	.10	1	.09							
10	2	Adult	Sham	Sham	.10	2	.07							
11	2	Adult	Sham	Sham	.10	3	.06							
12	2	Adult	Sham	Sham	.10	4	.07							
13	2	Adult	Sham	Sham	.10	5	.03							
14	2	Adult	Sham	Sham	.10	6	.16							
15	2	Adult	Sham	Sham	.10	7	.07							
16	2	Adult	Sham	Sham	.10	8	.10							
17	3	Adult	Sham	Sham	.06	1	.03							
18	3	Adult	Sham	Sham	.06	2	.06							
19	3	Adult	Sham	Sham	.06	3	.10							
20	3	Adult	Sham	Sham	.06	4	.03							
21	3	Adult	Sham	Sham	.06	5	.03							
22	3	Adult	Sham	Sham	.06	6	.0							
23	3	Adult	Sham	Sham	.06	7	.03							
24	3	Adult	Sham	Sham	.06	8	.0							
25	4	Adult	Stroke	Young-NT3	.0	1	.26							

Data View Variable View

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 9: Variable View for “long format” data

The screenshot shows the SPSS Variable View window. The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Window, and Help. The toolbar contains various icons for file operations, data manipulation, and analysis. The main area is a table with the following columns: Name, Type, Width, Decimals, Label, Values, Missing, Columns, Align, Measure, and Role. The variables listed are: rat (Numeric, 8 width, 0 decimals, None values, None missing, 8 columns, Right align, Nominal measure, Input role), Adult_vs_A... (Numeric, 8 width, 2 decimals, {1.00, Adult}... values, None missing, 11 columns, Right align, Nominal measure, Input role), injury (Numeric, 8 width, 0 decimals, {1, Sham}... values, None missing, 8 columns, Right align, Nominal measure, Input role), group (Numeric, 8 width, 2 decimals, {1.00, Aged-NT3}... values, None missing, 8 columns, Right align, Nominal measure, Input role), mean_preop (Numeric, 8 width, 2 decimals, None values, None missing, 8 columns, Right align, Scale measure, Input role), wave (Numeric, 4 width, 0 decimals, None values, None missing, 8 columns, Right align, Ordinal measure, Input role), and outcome (Numeric, 8 width, 2 decimals, None values, 999.00 missing, 8 columns, Right align, Scale measure, Input role). The bottom status bar indicates 'PASW Statistics Processor is ready'.

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	rat	Numeric	8	0		None	None	8	≡ Right	Nominal	Input
2	Adult_vs_A...	Numeric	8	2		{1.00, Adult}...	None	11	≡ Right	Nominal	Input
3	injury	Numeric	8	0		{1, Sham}...	None	8	≡ Right	Nominal	Input
4	group	Numeric	8	2		{1.00, Aged-NT3}...	None	8	≡ Right	Nominal	Input
5	mean_preop	Numeric	8	2		None	None	8	≡ Right	Scale	Input
6	wave	Numeric	4	0		None	None	8	≡ Right	Ordinal	Input
7	outcome	Numeric	8	2		None	999.00	8	≡ Right	Scale	Input
8											
9											
10											
11											
12											
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25											
26											

Data View Variable View

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 10: To plot individual rat performances over time, from “long format” data, click Graphs>Chart Builder

The screenshot shows the SPSS software interface. The 'Data View' window displays a dataset with the following columns: rat, Adult_vs_Aged, injury, group, mean_preop, wave, outcome, and several empty variable columns. The 'Chart Builder' dialog box is open, showing the 'Legacy Dialogs' section. The 'Data View' window shows the following data:

	rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	var	var	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18								
2	1	Adult	Stroke	Young-NT3	.0	2	.16								
3	1	Adult	Stroke	Young-NT3	.0	3	.10								
4	1	Adult	Stroke	Young-NT3	.0	4	.07								
5	1	Adult	Stroke	Young-NT3	.0	5	.03								
6	1	Adult	Stroke	Young-NT3	.0	6	.06								
7	1	Adult	Stroke	Young-NT3	.0	7	.03								
8	1	Adult	Stroke	Young-NT3	.0	8	.03								
9	2	Adult	Sham	Sham	.10	1	.09								
10	2	Adult	Sham	Sham	.10	2	.07								
11	2	Adult	Sham	Sham	.10	3	.06								
12	2	Adult	Sham	Sham	.10	4	.07								
13	2	Adult	Sham	Sham	.10	5	.03								
14	2	Adult	Sham	Sham	.10	6	.16								
15	2	Adult	Sham	Sham	.10	7	.07								
16	2	Adult	Sham	Sham	.10	8	.10								
17	3	Adult	Sham	Sham	.06	1	.03								
18	3	Adult	Sham	Sham	.06	2	.06								
19	3	Adult	Sham	Sham	.06	3	.10								
20	3	Adult	Sham	Sham	.06	4	.03								
21	3	Adult	Sham	Sham	.06	5	.03								
22	3	Adult	Sham	Sham	.06	6	.0								
23	3	Adult	Sham	Sham	.06	7	.03								
24	3	Adult	Sham	Sham	.06	8	.0								
25	4	Adult	Stroke	Young-NT3	.0	1	.26								

Supplementary Tutorial, Slide 11: The Warning dialog reminds you to make sure you set up the variable types in Variable View properly (*i.e.*, select Nominal / Ordinal / Scale correctly for each variable)

The screenshot displays the SPSS interface with a data table, a Chart Builder dialog, and a warning dialog. The data table shows variables 'rat', 'Adult_vs_Aged', and 'injury'. The Chart Builder dialog is open, showing a list of variables and a preview area. A warning dialog is overlaid on the Chart Builder, reminding the user to set measurement levels for variables.

1	rat	Adult_vs_Aged	injury
1	1	Adult	Stroke
2	1	Adult	Stroke
3	1	Adult	Stroke
4	1	Adult	Stroke
5	1	Adult	Stroke
6	1	Adult	Stroke
7	1	Adult	Stroke
8	1	Adult	Stroke
9	2	Adult	Share
10	2	Adult	Share
11	2	Adult	Share
12	2	Adult	Share
13	2	Adult	Share
14	2	Adult	Share
15	2	Adult	Share
16	2	Adult	Share
17	3	Adult	Share
18	3	Adult	Share
19	3	Adult	Share
20	3	Adult	Share
21	3	Adult	Share
22	3	Adult	Share
23	3	Adult	Share
24	3	Adult	Share
25	4	Adult	Stroke

Chart Builder Dialog:

- Variables: rat, Adult_vs_Aged, injury, group, mean_preop, wave, outcome
- Chart preview uses example data
- Drag a Gallery chart here to use it as your starting point
- OR
- Buttons: Element Properties..., Options...

Warning Dialog:

Before you use this dialog, measurement level should be set properly for each variable in your chart. In addition, if your chart contains categorical variables, value labels should be defined for each category.

Press OK to define your chart.

Press Define Variable Properties to set measurement level or define value labels for chart variables.

Don't show this dialog again

Buttons: OK, Define Variable Properties...

Supplementary Tutorial, Slide 12: Click on "Line" then drag the icon with three lines into the "Chart preview" window

The screenshot displays the SPSS interface with the Chart Builder and Element Properties windows open. The Chart Builder window shows a data table on the left and a chart preview on the right. The Element Properties window is open on the right, showing settings for a 'Line1' element. A green arrow points from the 'Line' icon in the 'Choose from' gallery to the chart preview area.

1	rat	Adult_vs_Aged	injury
1	1	Adult	Stroke
2	1	Adult	Stroke
3	1	Adult	Stroke
4	1	Adult	Stroke
5	1	Adult	Stroke
6	1	Adult	Stroke
7	1	Adult	Stroke
8	1	Adult	Stroke
9	2	Adult	Share
10	2	Adult	Share
11	2	Adult	Share
12	2	Adult	Share
13	2	Adult	Share
14	2	Adult	Share
15	2	Adult	Share
16	2	Adult	Share
17	3	Adult	Share
18	3	Adult	Share
19	3	Adult	Share
20	3	Adult	Share
21	3	Adult	Share
22	3	Adult	Share
23	3	Adult	Share
24	3	Adult	Share
25	4	Adult	Stroke

Chart Builder
Variables: rat, Adult_vs_Aged, injury, group, mean_preop, wave, outcome
Chart preview uses example data
Y-Axis:
X-Axis:
Set color

Element Properties
Edit Properties of: Line1
X-Axis1 (Line1)
Y-Axis1 (Line1)
GroupColor (Line1)
Statistics: Variable:
Statistic: Count
Set Parameters...
Display error bars
Error Bars Represent: Confidence intervals (Level: 95%), Standard error (Multiplier: 2), Standard deviation (Multiplier: 2)
Interpolation: Type: Straight, Location: Left
Interpolate through missing values

Choose from:
Favorites: Bar, Line, Area, Pie/Polar, Scatter/Dot, Histogram, High-Low, Boxplot, Dual Axes

Supplementary Tutorial, Slide 13:

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1 : rat 1

	rat	Adult_vs_Aged	injury
1	1	Adult	Stroke
2	1	Adult	Stroke
3	1	Adult	Stroke
4	1	Adult	Stroke
5	1	Adult	Stroke
6	1	Adult	Stroke
7	1	Adult	Stroke
8	1	Adult	Stroke
9	2	Adult	Share
10	2	Adult	Share
11	2	Adult	Share
12	2	Adult	Share
13	2	Adult	Share
14	2	Adult	Share
15	2	Adult	Share
16	2	Adult	Share
17	3	Adult	Share
18	3	Adult	Share
19	3	Adult	Share
20	3	Adult	Share
21	3	Adult	Share
22	3	Adult	Share
23	3	Adult	Share
24	3	Adult	Share
25	4	Adult	Stroke

Chart Builder

Variables:

- rat
- Adult_vs_Aged
- injury
- group
- mean_preop
- wave
- outcome

Chart preview uses example data

Mean outcome

Category 1 Category 2 [More...]

group

Set color rat

Checked items add drop zones to the canvas to which variables can be assigned.

- Clustering variable on X
- Clustering variable on Z
- Grouping/stacking variable
- Rows panel variable
- Columns panel variable
- Point ID label

Element Properties

Edit Properties of:

Line1

X-Axis1 (Line1)

Y-Axis1 (Line1)

GroupColor (Line1)

Statistics

Variable: outcome

Statistic: Mean

Display error bars

Error Bars Represent

- Confidence intervals
 - Level (%): 95
- Standard error
 - Multiplier: 1
- Standard deviation
 - Multiplier: 1

Interpolation

Type: Straight

Location: Left

Interpolate through missing values

OK Paste Reset Cancel Help

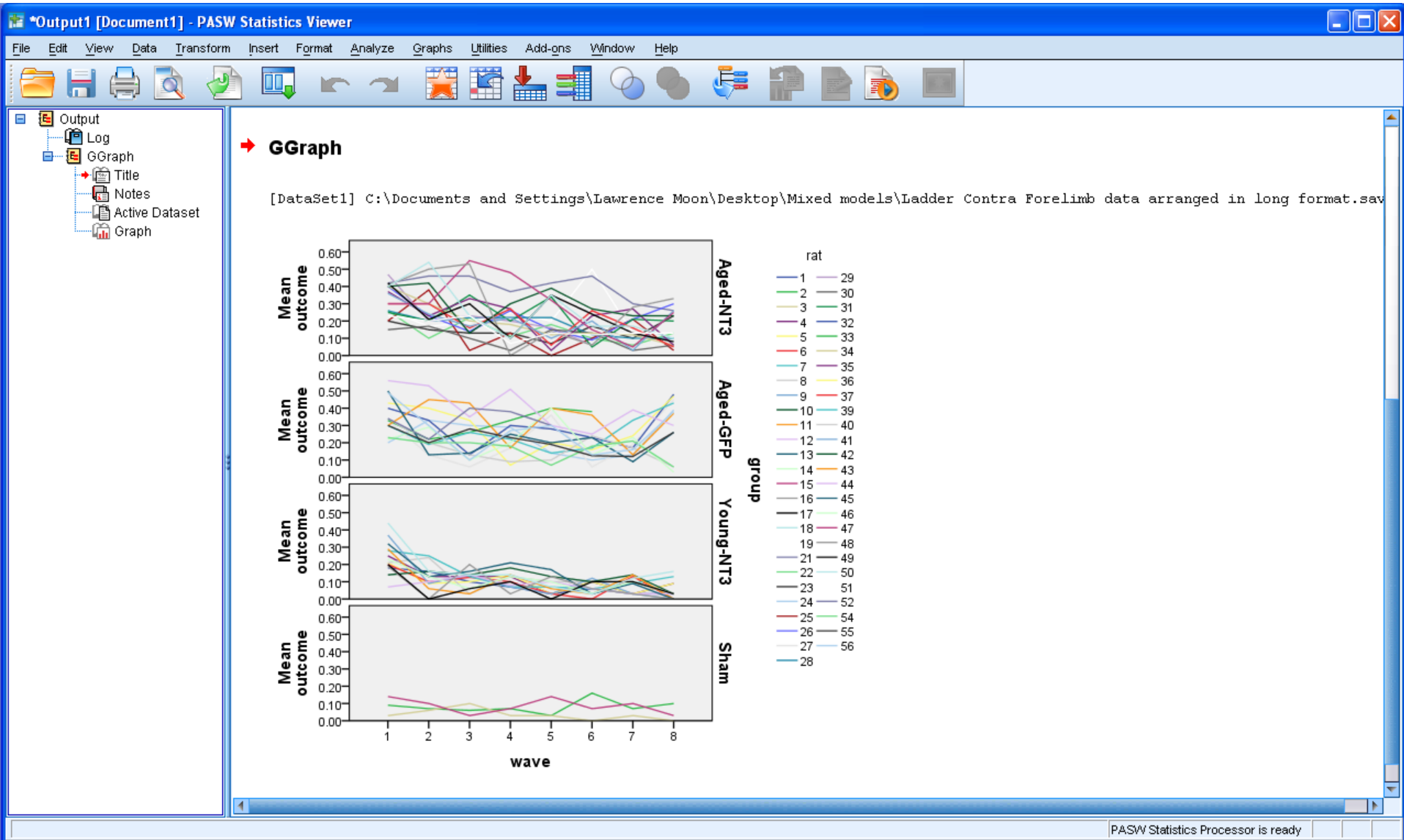
Apply Close Help

Data View Variable View

PASW Statistics Processor is ready

start 7 Micro... Screen s... Duricki Gr... 3 Micro... 3 Firefox Microsoft... Adobe Ph... 2 PASW... 17:06

Supplementary Tutorial, Slide 14 and Figure 4: Graphs showing individual rat performances over time arranged by group and colour coded according to Subject number (rat).



Supplementary Tutorial, Slide 15: How to generate a graph of mean group performance over time.

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1 : rat	1		
	rat	Adult_vs_Aged	injury
1	1	Adult	Stroke
2	1	Adult	Stroke
3	1	Adult	Stroke
4	1	Adult	Stroke
5	1	Adult	Stroke
6	1	Adult	Stroke
7	1	Adult	Stroke
8	1	Adult	Stroke
9	2	Adult	Sham
10	2	Adult	Sham
11	2	Adult	Sham
12	2	Adult	Sham
13	2	Adult	Sham
14	2	Adult	Sham
15	2	Adult	Sham
16	2	Adult	Sham
17	3	Adult	Sham
18	3	Adult	Sham
19	3	Adult	Sham
20	3	Adult	Sham
21	3	Adult	Sham
22	3	Adult	Sham
23	3	Adult	Sham
24	3	Adult	Sham
25	4	Adult	Stroke

Chart Builder

Variables:

- rat
- Adult_vs_Aged
- injury
- group
- mean_preop
- wave
- outcome

Chart preview uses example data

Checked items add drop zones to the canvas to which variables can be assigned.

- Clustering variable on X
- Clustering variable on Z
- Grouping/stacking variable
- Rows panel variable
- Columns panel variable
- Point ID label

Element Properties... Options...

OK Paste Reset Cancel Help

Element Properties

Edit Properties of:

- Line1
- X-Axis1 (Line1)
- Y-Axis1 (Line1)
- GroupColor (Line1)

Statistics:

Variable: outcome

Statistic: Mean

Set Parameters...

Display error bars

Error Bars Represent:

- Confidence intervals
 - Level (%):
- Standard error
 - Multiplier:
- Standard deviation
 - Multiplier:

Interpolation:

Type:

Location:

Interpolate through missing values

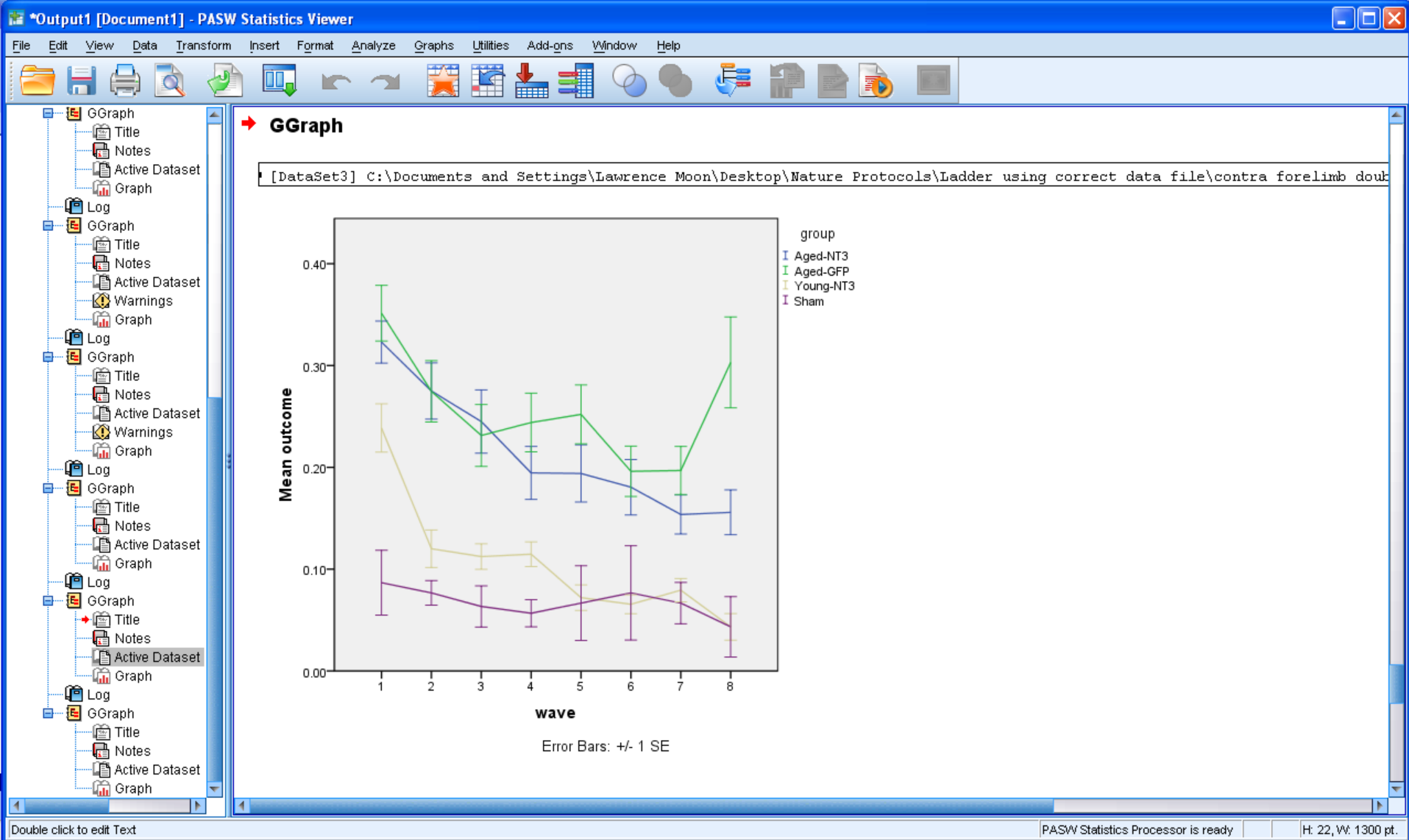
Apply Close Help

Data View Variable View

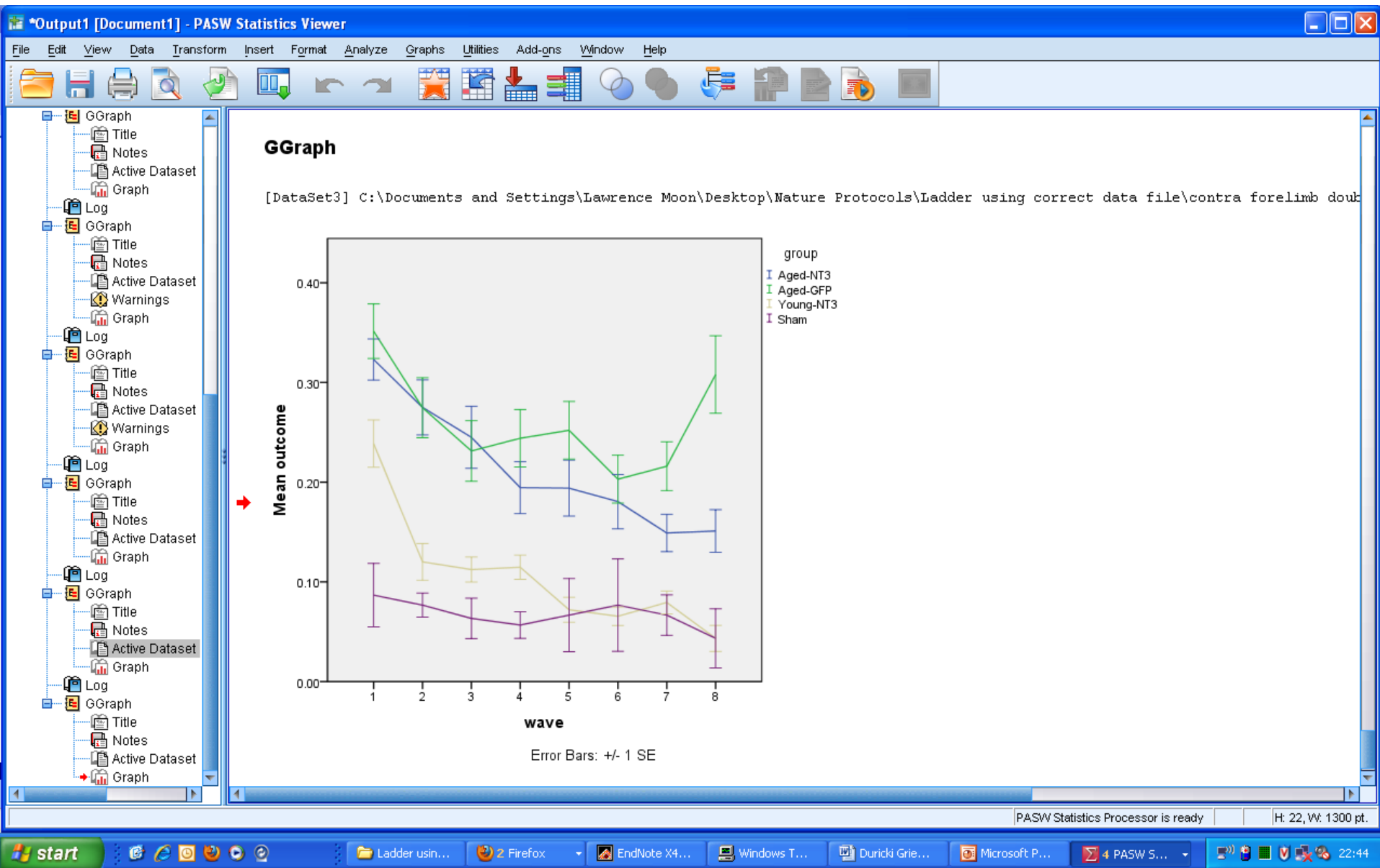
PASW Statistics Processor is ready

start 7 Micro... Screen s... Duricki Gr... 3 Micro... 3 Firefox Microsoft... Adobe Ph... 2 PASW... 17:07

Supplementary Tutorial, Slide 16 and Figure 5: Graphs showing mean performances over time arranged by group. Note that the last data points for AAV-NT3 and AAV-GFP do not include data from rats with missing values



Supplementary Tutorial, Slide 17: Same data but plotted with missing values replaced by Last Value Carried Forward. Data points now include all available data from all animals.



Supplementary Tutorial, Slide 18: How to determine if group variances are similar *i.e.*, test if group variances are “heterogeneous”

The screenshot displays the SPSS software interface. The main window shows a data view with the following columns: rat, Adult_vs_Aged, injury, group, mean_preop, wave, outcome, and seven columns labeled 'var'. The data is organized into rows, with the first 8 rows representing 'Young-NT3' and the remaining 17 rows representing 'Sham'. The 'var' columns are currently empty.

	rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	var	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18							
2	1	Adult	Stroke	Young-NT3	.0	2	.16							
3	1	Adult	Stroke	Young-NT3	.0	3	.10							
4	1	Adult	Stroke	Young-NT3	.0	4	.07							
5	1	Adult	Stroke	Young-NT3	.0	5	.03							
6	1	Adult	Stroke	Young-NT3	.0	6	.06							
7	1	Adult	Stroke	Young-NT3	.0	7	.03							
8	1	Adult	Stroke	Young-NT3	.0	8	.03							
9	2	Adult	Sham	Sham	.10	1	.09							
10	2	Adult	Sham	Sham	.10	2	.07							
11	2	Adult	Sham	Sham	.10	3	.06							
12	2	Adult	Sham	Sham	.10	4	.07							
13	2	Adult	Sham	Sham	.10	5	.03							
14	2	Adult	Sham	Sham	.10	6	.16							
15	2	Adult	Sham	Sham	.10	7	.07							
16	2	Adult	Sham	Sham	.10	8	.10							
17	3	Adult	Sham	Sham	.06	1	.03							
18	3	Adult	Sham	Sham	.06	2	.06							
19	3	Adult	Sham	Sham	.06	3	.10							
20	3	Adult	Sham	Sham	.06	4	.03							
21	3	Adult	Sham	Sham	.06	5	.03							
22	3	Adult	Sham	Sham	.06	6	.0							
23	3	Adult	Sham	Sham	.06	7	.03							
24	3	Adult	Sham	Sham	.06	8	.0							
25	4	Adult	Stroke	Young-NT3	.0	1	.25							

Supplementary Tutorial, Slide 19:

The screenshot displays the SPSS interface with the following components:

- Data Table:** A table with 25 rows and 4 columns: 'rat', 'Adult_vs_Aged', 'injury', and 'outcome'. The 'rat' column contains values 1, 2, 3, and 4. The 'Adult_vs_Aged' column contains 'Adult' and 'Shan'. The 'injury' column contains 'Stroke' and 'Shan'. The 'outcome' column contains 'stroke' and 'shank'.
- Chart Builder Dialog:** Shows a list of variables on the left and a chart preview on the right. The 'wave' variable is selected for the Y-axis. A message box is overlaid on the dialog.
- Message Box:** A blue dialog box with an information icon. The text reads: "Before you use this dialog, measurement level should be set properly for each variable in your chart. In addition, if your chart contains categorical variables, value labels should be defined for each category. Press OK to define your chart. Press Define Variable Properties to set measurement level or define value labels for chart variables. Don't show this dialog again." Buttons for 'OK' and 'Define Variable Properties...' are visible.
- Element Properties Dialog:** Shows the 'Box1' element selected. The 'Variable' is set to 'outcome' and the 'Statistic' is 'Boxplot'. There are buttons for 'Set Parameters...', 'Element Properties...', and 'Options...'.
- SPSS Menu Bar:** File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Window, Help.
- SPSS Toolbar:** Standard icons for file operations and analysis.
- Bottom Bar:** 'Data View' and 'Variable View' tabs.

Supplementary Tutorial, Slide 20:

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1: rat	1		
	rat	Adult_vs_Aged	injury
1	1	Adult	Stroke
2	1	Adult	Stroke
3	1	Adult	Stroke
4	1	Adult	Stroke
5	1	Adult	Stroke
6	1	Adult	Stroke
7	1	Adult	Stroke
8	1	Adult	Stroke
9	2	Adult	Shan
10	2	Adult	Shan
11	2	Adult	Shan
12	2	Adult	Shan
13	2	Adult	Shan
14	2	Adult	Shan
15	2	Adult	Shan
16	2	Adult	Shan
17	3	Adult	Shan
18	3	Adult	Shan
19	3	Adult	Shan
20	3	Adult	Shan
21	3	Adult	Shan
22	3	Adult	Shan
23	3	Adult	Shan
24	3	Adult	Shan
25	4	Adult	Stroke

Chart Builder

Variables:

- rat
- Adult_vs_Aged
- injury
- group
- mean_preop
- wave
- outcome

Chart preview uses example data

Cluster on X: set color

Y-Axis?

X-Axis?

No variables selected

Gallery Basic Elements Groups/Point ID Titles/Footnotes

Choose from:

- Favorites
- Bar
- Line
- Area
- Pie/Polar
- Scatter/Dot
- Histogram
- High-Low
- Boxplot
- Dual Axes

Element Properties... Options...

OK Paste Reset Cancel Help

Element Properties

Edit Properties of:

- Box1
- X-Axis1 (Box1)
- Y-Axis1 (Box1)
- GroupColor (Box1)

Statistics

Variable:

Statistic: Boxplot

Set Parameters...

Display error bars

Error Bars Represent

- Confidence intervals (Level (%): 95)
- Standard error (Multiplier: 2)
- Standard deviation (Multiplier: 2)

Apply Close Help

PASW Statistics Processor is ready

start 4 Mic... Windo... NATUR... 2 Mic... 2 Fire... EndNot... 2 PAS... Micro... 07:11

Supplementary Tutorial, Slide 21:

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1: rat	1		
	rat	Adult_vs_Aged	injury
1	1	Adult	Stroke
2	1	Adult	Stroke
3	1	Adult	Stroke
4	1	Adult	Stroke
5	1	Adult	Stroke
6	1	Adult	Stroke
7	1	Adult	Stroke
8	1	Adult	Stroke
9	2	Adult	Shan
10	2	Adult	Shan
11	2	Adult	Shan
12	2	Adult	Shan
13	2	Adult	Shan
14	2	Adult	Shan
15	2	Adult	Shan
16	2	Adult	Shan
17	3	Adult	Shan
18	3	Adult	Shan
19	3	Adult	Shan
20	3	Adult	Shan
21	3	Adult	Shan
22	3	Adult	Shan
23	3	Adult	Shan
24	3	Adult	Shan
25	4	Adult	Stroke

Chart Builder

Variables:

- rat
- Adult_vs_Aged
- injury
- group
- mean_preop
- wave
- outcome

Chart preview uses example data

Cluster on X; set color

outcome

Aged-NT3 Aged-GFP [More...]

group

Gallery Basic Elements Groups/Point ID Titles/Footnotes

Choose from:

- Favorites
- Bar
- Line
- Area
- Pie/Polar
- Scatter/Dot
- Histogram
- High-Low
- Boxplot
- Dual Axes

Element Properties... Options...

OK Paste Reset Cancel Help

Element Properties

Edit Properties of:

- Box1
- X-Axis1 (Box1)
- Y-Axis1 (Box1)
- GroupColor (Box1)

Statistics:

Variable: outcome

Statistic: Boxplot

Set Parameters...

Display error bars

Error Bars Represent:

- Confidence intervals
Level (%): 95
- Standard error
Multiplier: 2
- Standard deviation
Multiplier: 2

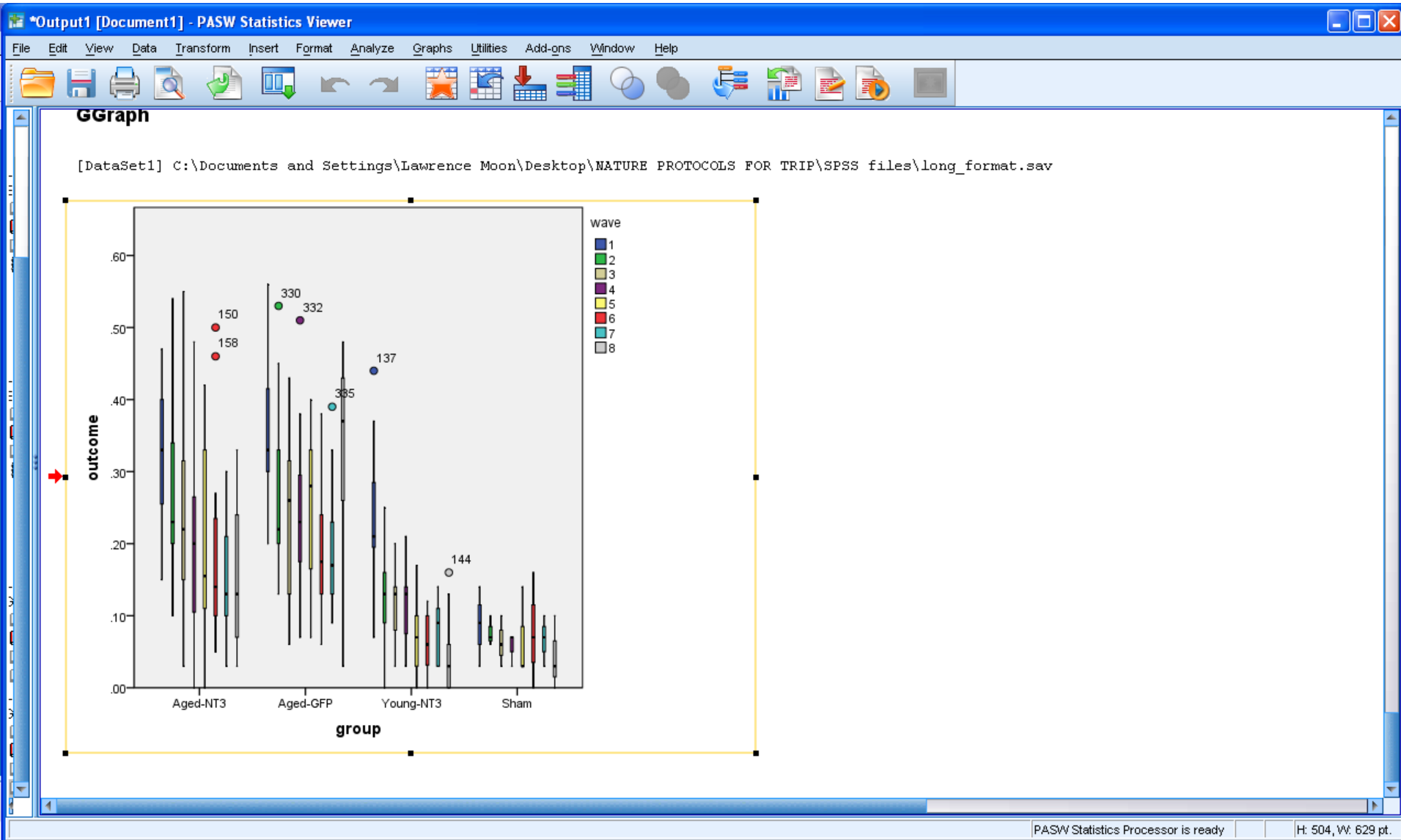
Apply Close Help

Data View Variable View

PASW Statistics Processor is ready

start 4 Mic... Windo... NATUR... 2 Mic... 2 Fire... EndNot... 2 PAS... Micro... 07:12

Supplementary Tutorial, Slide 22:



Supplementary Tutorial, Slide 23

The screenshot displays the SPSS Chart Editor interface. The main chart is a box plot showing the distribution of 'outcome' (y-axis, 0.0 to 0.60) across four groups: Aged-NT3, Aged-GFP, Young-NT3, and Sham (x-axis). The plot includes individual data points for each group, with some points labeled with their IDs: 150, 158, 330, 332, 137, 385, and 144. A legend on the right indicates the 'wave' for each data point, with colors corresponding to waves 1 through 8. The Properties dialog box is open, showing the 'Chart Size' tab. The 'Size in points' section has 'Height' set to 375 and 'Width' set to 468.75. The 'Maintain aspect ratio' checkbox is checked, and the 'Resize elements when new elements are added/removed' checkbox is also checked. The status bar at the bottom indicates 'PASW Statistics Processor is ready' and 'H: 504, W: 629 pt.'

Group	Outcome (approximate)	Wave	Label
Aged-NT3	0.50	1	150
Aged-NT3	0.48	2	158
Aged-GFP	0.53	3	330
Aged-GFP	0.51	4	332
Young-NT3	0.45	5	137
Young-NT3	0.39	6	385
Sham	0.17	7	144

Supplementary Tutorial, Slide 24:

The screenshot displays the SPSS Chart Editor interface. The main window shows a bar chart with the y-axis labeled 'come' and the x-axis labeled 'group'. The chart features four groups: 'Aged-N13', 'Aged-13PP', 'Young-N13', and 'Sham'. Each group has a bar with a yellow outline and a black error bar. Individual data points are plotted as red circles with labels: 150 and 158 for Aged-N13; 330 and 332 for Aged-13PP; 333 and 137 for Young-N13; and 137 for Sham. A Properties dialog box is open over the chart, showing the 'Bar Options' tab. The 'Width' section includes sliders for 'Bars' (set to 100%) and 'Clusters' (set to 85%). The 'Boxplot and Error Bar Style' section has radio buttons for 'I-Bar', 'Whiskers', and 'Bars' (which is selected). The status bar at the bottom indicates 'PASW Statistics Processor is ready' and 'H: 504, W: 629 pt.'

Chart Editor

File Edit View Options Elements Help

on\Desktop\NA

come

60

50

40

150

158

330

332

333

137

137

group

Aged-N13 Aged-13PP Young-N13 Sham

H:799.5, W:999.75 points

Properties

Chart Size

Fill & Border Categories **Bar Options** Variables

Width

Bars 100 %: 100

Clusters 85 %: 85

Link the box, median line, and error bar widths

Scale boxplot and error bar width based on count

Boxplot and Error Bar Style

I-Bar

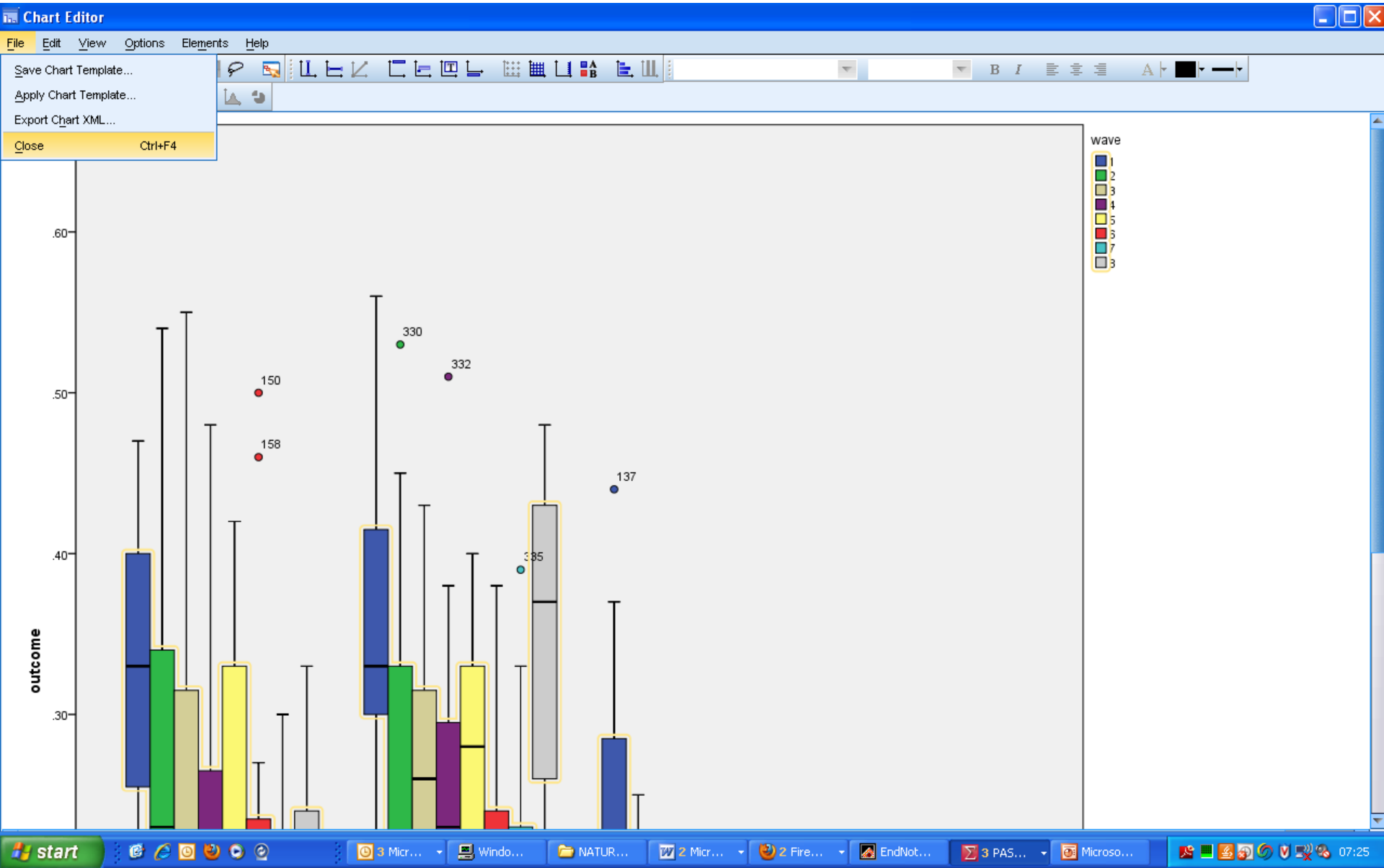
Whiskers

Bars

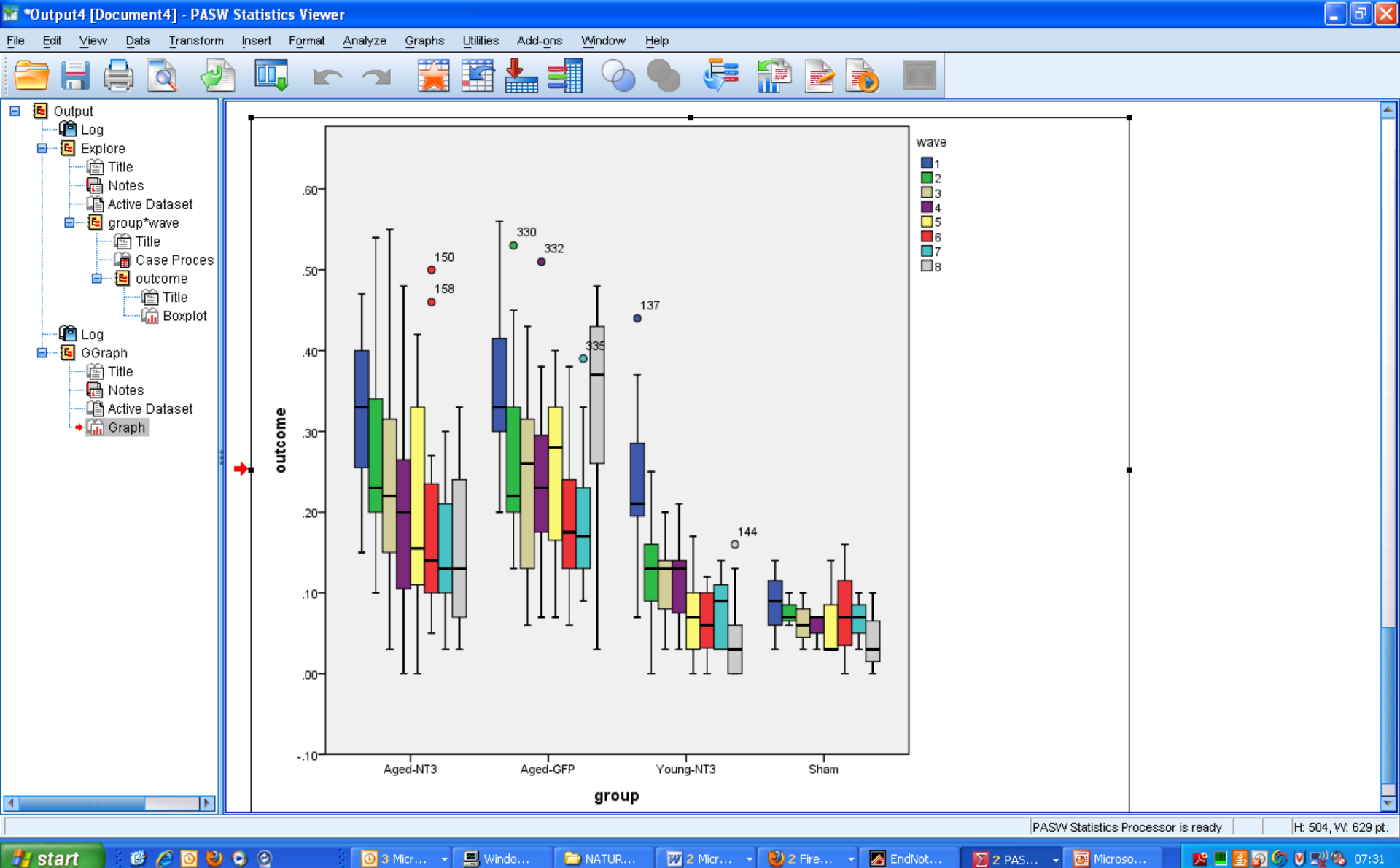
Apply Cancel Help

PASW Statistics Processor is ready H: 504, W: 629 pt.

Supplementary Tutorial, Slide 25:



Supplementary Tutorial, Slide 26:



Supplementary Tutorial, Slide 27:

The screenshot displays the SPSS (PASW Statistics Processor) interface. The 'Data' menu is open, and 'Split File...' is highlighted. The data table below shows the following structure:

Case #	group	mean_preop	mean_postop 1	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
1	Young-NT3	.0	.18	.16	.10	.07	.03	.06	.03	.03	
2	Sham	.10	.09	.07	.06	.07	.03	.16	.07	.10	
3	Sham	.06	.03	.06	.10	.03	.03	.0	.03	.0	
4	Young-NT3	.0	.25	.13	.13	.13	.03	.10	.03	.09	
5	Young-NT3	.0	.21	.09	.10	.14	.03	.10	.03	.09	
6	Young-NT3	.0	.20	.10	.13	.10	.03	.0	.13	.0	
7	Young-NT3	.0	.28	.25	.13	.07	.07	.06	.09	.13	
8	Young-NT3	.03	.21	.24	.03	.13	.10	.10	.10	.03	
9	Young-NT3	.07	.37	.09	.14	.07	.03	.12	.03	.0	
10	Young-NT3	.14	.14	.16	.14	.18	.13	.10	.14	.03	
11	Young-NT3	.0	.29	.06	.03	.14	.06	.03	.14	.0	
12	Young-NT3	.03	.07	.10	.14	.08	.10	.06	.03	.03	
13	Young-NT3	.13	.32	.13	.16	.21	.17	.03	.09	.0	
14	Young-NT3	.0	.23	.13	.06	.13	.10	.03	.10	.03	
15	Sham	.03	.14	.10	.03	.07	.14	.07	.10	.03	
16	Young-NT3	.03	.19	.0	.20	.03	.13	.06	.03	.0	
17	Adult Stroke	.13	.20	.0	.06	.10	.0	.10	.10	.03	
18	Adult Stroke	.06	.44	.16	.14	.14	.07	.03	.12	.16	
19	Aged Stroke	.04	.26	.17	.19	.25	.20	.50	.13	.10	
20	Aged Stroke	.13	.42	.46	.46	.37	.42	.46	.30	.26	
21	Aged Stroke	.10	.26	.10	.22	.11	.18	.10	.06	.13	
22	Aged Stroke	.10	.20	.15	.13	.13	.07	.17	.10	.23	
23	Aged Stroke	.03	.20	.33	.30	.29	.14	.10	.13	.39	
24	Aged Stroke	.03	.20	.38	.03	.13	.0	.10	.21	.03	

At the bottom of the window, the status bar reads 'PASW Statistics Processor is ready'. The Windows taskbar at the very bottom shows the Start button and several open applications including Adobe Reader, Ladder, Duricki, Linear, EndNot, Skype, PASW, Micro, and Microsoft Office.

Supplementary Tutorial, Slide 28:

The screenshot displays the SPSS (PASW Statistics Processor) interface. The main window shows a data table with 24 rows and 15 columns. A 'Split File' dialog box is open in the foreground, allowing the user to analyze data by groups. The dialog box has the following options:

- Analyze all cases, do not create groups
- Compare groups
- Organize output by groups

Under 'Groups Based on:', the variable 'group' is selected. Additional options include:

- Sort the file by grouping variables
- File is already sorted

Buttons at the bottom of the dialog include OK, Paste, Reset, Cancel, and Help. The current status is 'Analysis by groups is off.' The data table in the background contains the following information:

rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop 1	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
1	1	Adult	Stroke	Young-NT3	.0	.18	.16	.10	.07	.03	.06	.03	.03
2	2	Adult	Sham	Sham	.10	.09	.07	.06	.07	.03	.16	.07	.10
3	3	Adult	Sham	Sham	.06	.03	.06	.10	.03	.03	.0	.03	.0
4	4	Adult	Stroke	Young-NT3						.03	.10	.03	.09
5	5	Adult	Stroke	Young-NT3						.03	.10	.03	.09
6	6	Adult	Stroke	Young-NT3						.03	.0	.13	.0
7	7	Adult	Stroke	Young-NT3						.07	.06	.09	.13
8	8	Adult	Stroke	Young-NT3						.10	.10	.10	.03
9	9	Adult	Stroke	Young-NT3						.03	.12	.03	.0
10	10	Adult	Stroke	Young-NT3						.13	.10	.14	.03
11	11	Adult	Stroke	Young-NT3						.06	.03	.14	.0
12	12	Adult	Stroke	Young-NT3						.10	.06	.03	.03
13	13	Adult	Stroke	Young-NT3						.17	.03	.09	.0
14	14	Adult	Stroke	Young-NT3						.10	.03	.10	.03
15	15	Adult	Stroke	Young-NT3						.14	.07	.10	.03
16	16	Adult	Stroke	Young-NT3						.13	.06	.03	.0
17	17	Adult	Stroke	Young-NT3						.0	.10	.10	.03
18	18	Adult	Stroke	Young-NT3						.07	.03	.12	.16
19	19	Aged	Stroke	Aged-NT3	.04	.26	.17	.19	.25	.20	.50	.13	.10
20	21	Aged	Stroke	Aged-NT3	.13	.42	.46	.46	.37	.42	.46	.30	.26
21	22	Aged	Stroke	Aged-NT3	.10	.26	.10	.22	.11	.18	.10	.06	.13
22	23	Aged	Stroke	Aged-NT3	.10	.20	.15	.13	.13	.07	.17	.10	.23
23	24	Aged	Stroke	Aged-GFP	.03	.20	.33	.30	.29	.14	.10	.13	.39
24	25	Aged	Stroke	Aged-NT3	.03	.20	.38	.03	.13	.0	.10	.21	.03

Supplementary Tutorial, Slide 29:

The screenshot shows the SPSS software interface. The 'Analyze' menu is open, and the 'Correlate' option is selected. A sub-menu is visible with 'Bivariate...' highlighted. The main window displays a data table with the following structure:

	rat	Adult_y		mean_preop	mean_postop 1	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
1	19												
2	21												
3	22												
4	23												
5	25												
6	26												
7	28												
8	29												
9	30												
10	31												
11	34												
12	35												
13	37												
14	41												
15	42												
16	47												
17	48												
18	49												
19	50												
20	51												
21	24												
22	27												
23	32												
24	33												

At the bottom of the window, there are tabs for 'Data View' and 'Variable View', and a status bar indicating 'PASW Statistics Processor is ready' and 'Split by group'.

Supplementary Tutorial, Slide 30:

The screenshot displays the SPSS interface with a data table and two dialog boxes. The data table has 15 columns: 'rat', 'Adult_vs_Aged', 'injury', 'group', 'mean_preop', and eight 'mean_postop' columns (1-8), plus a 'var' column. The 'Bivariate Correlations' dialog box is open, showing 'rat', 'Adult_vs_Aged', 'injury', 'group', and 'mean_preop' in the left pane and 'mean_postop1' through 'mean_postop8' in the right pane. The 'Options' dialog box is also open, showing 'Statistics' and 'Missing Values' sections.

	rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop 1	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
1	19	Aged	Stroke	Aged-NT3	.04	.26	.17	.19	.25	.20	.50	.13	.10	
2	21	Aged	Stroke	Aged-						.42	.46	.30	.26	
3	22	Aged	Stroke	Aged-						.18	.10	.06	.13	
4	23	Aged	Stroke	Aged-						.07	.17	.10	.23	
5	25	Aged	Stroke	Aged-						.0	.10	.21	.03	
6	26	Aged	Stroke	Aged-						.15	.09	.21	.30	
7	28	Aged	Stroke	Aged-						.22	.12	.10	.10	
8	29	Aged	Stroke	Aged-						.16	.06	999.00	999.00	
9	30	Aged	Stroke	Aged-						15	13	.03	.06	
10	31	Aged	Stroke	Aged-								.21	.20	
11	34	Aged	Stroke	Aged-								.12	.06	
12	35	Aged	Stroke	Aged-								.27	.06	
13	37	Aged	Stroke	Aged-								.16	.05	
14	41	Aged	Stroke	Aged-								.03	.26	
15	42	Aged	Stroke	Aged-								.23	.23	
16	47	Aged	Stroke	Aged-								.05	.25	
17	48	Aged	Stroke	Aged-								.28	.33	
18	49	Aged	Stroke	Aged-								.13	.08	
19	50	Aged	Stroke	Aged-								.17	.10	
20	51	Aged	Stroke	Aged-NT3	.0	.23	.20	.23	.07	.13	.12	.13	.13	
21	24	Aged	Stroke	Aged-GFP	.03	.20	.33	.30	.29	.14	.10	.13	.39	
22	27	Aged	Stroke	Aged-GFP	.06	.33	.13	.06	.17	.36	.06	.19	.45	
23	32	Aged	Stroke	Aged-GFP	.03	.40	.33	.13	.30	.28	.23	.17	.48	
24	33	Aged	Stroke	Aged-GFP	.17	.33	.22	.26	.33	.40	.38	999.00	999.00	

Supplementary Tutorial, Slide 31: These correlations were generated without splitting the output by “group”. There is a significant and positive correlation between most pairs of time points. The size of the correlation stays similar with increasing separation of time points. This suggests that a compound symmetric (CS) covariance structure may be appropriate.

Output2 [Document2] - PASW Statistics Viewer

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Correlations

		mean_postop1	mean_postop2	mean_postop3	mean_postop4	mean_postop5	mean_postop6	mean_postop7	mean_postop8
mean_postop1	Pearson Correlation	1	.543**	.393**	.482**	.443**	.345*	.521**	.522**
	Sig. (2-tailed)		.000	.004	.000	.001	.012	.000	.000
	N	53	53	53	53	53	53	50	50
mean_postop2	Pearson Correlation	.543**	1	.545**	.413**	.531**	.433**	.636**	.499**
	Sig. (2-tailed)	.000		.000	.002	.000	.001	.000	.000
	N	53	53	53	53	53	53	50	50
mean_postop3	Pearson Correlation	.393**	.545**	1	.436**	.483**	.371**	.394**	.444**
	Sig. (2-tailed)	.004	.000		.001	.000	.007	.005	.001
	N	53	53	53	53	53	53	50	50
mean_postop4	Pearson Correlation	.482**	.413**	.436**	1	.521**	.502**	.446**	.427**
	Sig. (2-tailed)	.000	.002	.001		.000	.000	.001	.002
	N	53	53	53	53	53	53	50	50
mean_postop5	Pearson Correlation	.443**	.531**	.483**	.521**	1	.488**	.407**	.499**
	Sig. (2-tailed)	.001	.000	.000	.000		.000	.003	.000
	N	53	53	53	53	53	52	50	50
mean_postop6	Pearson Correlation	.345*	.433**	.371**	.502**	.488**	1	.352*	.285*
	Sig. (2-tailed)	.012	.001	.007	.000	.000		.012	.045
	N	52	52	52	52	52	52	50	50
mean_postop7	Pearson Correlation	.521**	.636**	.394**	.446**	.407**	.352*	1	.452**
	Sig. (2-tailed)	.000	.000	.005	.001	.003	.012		.001
	N	50	50	50	50	50	50	50	50
mean_postop8	Pearson Correlation	.522**	.499**	.444**	.427**	.499**	.285*	.452**	1
	Sig. (2-tailed)	.000	.000	.001	.002	.000	.045	.001	
	N	50	50	50	50	50	50	50	50

** . Correlation is significant at the 0.01 level (2-tailed).
 * . Correlation is significant at the 0.05 level (2-tailed).

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 32: RM ANCOVA

The screenshot displays the SPSS software interface. The 'Analyze' menu is open, and the 'Repeated Measures...' dialog box is selected. The dialog box is currently set to 'Univariate...'. The data editor window shows a dataset with 24 rows and 13 columns. The columns are labeled 'rat', 'Adult_v', and 'mean_postop' (with subscripts 2 through 8). The 'mean_postop' columns contain numerical values ranging from 0 to 0.50. The 'Adult_v' column contains categorical values like 'Young-NT3', 'Aged-NT3', 'Aged-GFP', and 'Aged-Stroke'.

Row	rat	Adult_v	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
1	1	Young-NT3	.16	.10	.07	.03	.06	.03	.03	
2	2	Young-NT3	.07	.06	.07	.03	.16	.07	.10	
3	3	Young-NT3	.06	.10	.03	.03	.0	.03	.0	
4	4	Young-NT3	.13	.13	.13	.03	.10	.03	.09	
5	5	Young-NT3	.0	.21	.09	.10	.14	.03	.09	
6	6	Young-NT3	.0	.20	.10	.13	.10	.03	.0	
7	7	Young-NT3	.0	.28	.25	.13	.07	.07	.06	.09
8	8	Young-NT3	.03	.21	.24	.03	.13	.10	.10	.03
9	9	Young-NT3	.07	.37	.09	.14	.07	.03	.12	.03
10	10	Young-NT3	.14	.14	.16	.14	.18	.13	.10	.14
11	11	Young-NT3	.0	.29	.06	.03	.14	.06	.03	.14
12	12	Young-NT3	.03	.07	.10	.14	.08	.10	.06	.03
13	13	Young-NT3	.13	.32	.13	.16	.21	.17	.03	.09
14	14	Young-NT3	.0	.23	.13	.06	.13	.10	.03	.10
15	15	Young-NT3	.03	.14	.10	.03	.07	.14	.07	.10
16	16	Young-NT3	.03	.19	.0	.20	.03	.13	.06	.03
17	17	Young-NT3	.13	.20	.0	.06	.10	.0	.10	.10
18	18	Young-Stroke	.06	.44	.16	.14	.14	.07	.03	.12
19	19	Young-Stroke	.04	.26	.17	.19	.25	.20	.50	.13
20	21	Young-Stroke	.13	.42	.46	.46	.37	.42	.46	.30
21	22	Young-Stroke	.10	.26	.10	.22	.11	.18	.10	.06
22	23	Young-Stroke	.10	.20	.15	.13	.13	.07	.17	.10
23	24	Young-Stroke	.03	.20	.33	.30	.29	.14	.10	.13
24	25	Young-Stroke	.03	.20	.38	.03	.13	.0	.10	.21

Supplementary Tutorial, Slide 33

The screenshot displays the SPSS software interface. The main window shows a data table with 24 rows and 15 columns. The columns are labeled: rat, Adult_vs_Aged, injury, group, mean_preop, mean_postop 1, mean_postop 2, mean_postop 3, mean_postop 4, mean_postop 5, mean_postop 6, mean_postop 7, mean_postop 8, and var. The data rows contain numerical values for each variable. A dialog box titled 'Repeated Measures Defin...' is open in the center, showing the 'Within-Subject Factor Name' as 'wave' and the 'Number of Levels' as 8. The 'Measure Name' field is empty. The dialog box has buttons for 'Add', 'Change', 'Remove', 'Define', 'Reset', 'Cancel', and 'Help'. The status bar at the bottom indicates 'PASW Statistics Processor is ready'.

	rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop 1	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
1	1	Adult	Stroke	Young-NT3	.0	.18	.16	.10	.07	.03	.06	.03	.03	
2	2	Adult	Sham	Sham	.10	.06	.07	.03	.16	.07	.10	.10	.03	
3	3	Adult	Sham	Sham	.06	.10	.03	.03	.0	.03	.0	.03	.0	
4	4	Adult	Stroke	Young-NT3	.0	.13	.13	.03	.10	.03	.09	.03	.09	
5	5	Adult	Stroke	Young-NT3	.0	.10	.14	.03	.10	.03	.09	.03	.09	
6	6	Adult	Stroke	Young-NT3	.0	.13	.10	.03	.0	.13	.0	.13	.0	
7	7	Adult	Stroke	Young-NT3	.0	.13	.07	.07	.06	.09	.13	.03	.13	
8	8	Adult	Stroke	Young-NT3	.03	.03	.13	.10	.10	.10	.03	.10	.03	
9	9	Adult	Stroke	Young-NT3	.07	.14	.07	.03	.12	.03	.0	.03	.0	
10	10	Adult	Stroke	Young-NT3	.14	.14	.18	.13	.10	.14	.03	.14	.03	
11	11	Adult	Stroke	Young-NT3	.0	.03	.14	.06	.03	.14	.0	.14	.0	
12	12	Adult	Stroke	Young-NT3	.03	.14	.08	.10	.06	.03	.03	.03	.03	
13	13	Adult	Stroke	Young-NT3	.13	.16	.21	.17	.03	.09	.0	.09	.0	
14	14	Adult	Stroke	Young-NT3	.0	.06	.13	.10	.03	.10	.03	.10	.03	
15	15	Adult	Sham	Sham	.03	.03	.07	.14	.07	.10	.03	.10	.03	
16	16	Adult	Stroke	Young-NT3	.03	.20	.03	.13	.06	.03	.0	.03	.0	
17	17	Adult	Stroke	Young-NT3	.13	.06	.10	.0	.10	.10	.03	.10	.03	
18	18	Adult	Stroke	Young-NT3	.06	.14	.14	.07	.03	.12	.16	.12	.16	
19	19	Aged	Stroke	Aged-NT3	.04	.19	.25	.20	.50	.13	.10	.13	.10	
20	21	Aged	Stroke	Aged-NT3	.13	.42	.46	.46	.37	.42	.46	.30	.26	
21	22	Aged	Stroke	Aged-NT3	.10	.26	.10	.22	.11	.18	.10	.06	.13	
22	23	Aged	Stroke	Aged-NT3	.10	.20	.15	.13	.13	.07	.17	.10	.23	
23	24	Aged	Stroke	Aged-GFP	.03	.20	.33	.30	.29	.14	.10	.13	.39	
24	25	Aged	Stroke	Aged-NT3	.03	.20	.38	.03	.13	.0	.10	.21	.03	

Supplementary Tutorial, Slide 34: Note that the Repeated Measure only includes the eight post-treatment time points and does not include the pre-operative baseline measurement time point (as this reduces the power of the test).

The screenshot displays the SPSS interface with a data table and a 'Repeated Measures' dialog box. The data table has columns for 'rat', 'Adult_vs_Aged', 'injury', 'group', 'mean_preop', and eight 'mean_postop' variables (1-8), plus a 'var' column. The 'Repeated Measures' dialog box is open, showing the following configuration:

- Within-Subjects Variables (wave):** mean_postop1(1), mean_postop2(2), mean_postop3(3), mean_postop4(4), mean_postop5(5), mean_postop6(6), mean_postop7(7), mean_postop8(8)
- Between-Subjects Factor(s):** group
- Covariates:** mean_preop

The dialog box also includes buttons for 'Model...', 'Contrasts...', 'Plots...', 'Post Hoc...', 'Save...', 'Options...', 'OK', 'Paste', 'Reset', 'Cancel', and 'Help'.

rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop1	mean_postop2	mean_postop3	mean_postop4	mean_postop5	mean_postop6	mean_postop7	mean_postop8	var	
1	1	Adult	Stroke	You		.03	.06	.03	.03					
2	2	Adult	Sham			.03	.16	.07	.10					
3	3	Adult	Sham			.03	.0	.03	.0					
4	4	Adult	Stroke	You		.03	.10	.03	.09					
5	5	Adult	Stroke	You		.03	.10	.03	.09					
6	6	Adult	Stroke	You		.03	.0	.13	.0					
7	7	Adult	Stroke	You		.07	.06	.09	.13					
8	8	Adult	Stroke	You		.10	.10	.10	.03					
9	9	Adult	Stroke	You		.03	.12	.03	.0					
10	10	Adult	Stroke	You		.13	.10	.14	.03					
11	11	Adult	Stroke	You		.06	.03	.14	.0					
12	12	Adult	Stroke	You		.10	.06	.03	.03					
13	13	Adult	Stroke	You		.17	.03	.09	.0					
14	14	Adult	Stroke	You		.10	.03	.10	.03					
15	15	Adult	Sham			.14	.07	.10	.03					
16	16	Adult	Stroke	You		.13	.06	.03	.0					
17	17	Adult	Stroke	You		.0	.10	.10	.03					
18	18	Adult	Stroke	You		.07	.03	.12	.16					
19	19	Aged	Stroke	Ag		.20	.50	.13	.10					
20	21	Aged	Stroke	Ag		.42	.46	.30	.26					
21	22	Aged	Stroke	Aged-NT3		.10	.26	.10	.22	.11	.18	.10	.06	.13
22	23	Aged	Stroke	Aged-NT3		.10	.20	.15	.13	.13	.07	.17	.10	.23
23	24	Aged	Stroke	Aged-GFP		.03	.20	.33	.30	.29	.14	.10	.13	.39
24	25	Aged	Stroke	Aged-NT3		.03	.20	.38	.03	.13	.0	.10	.21	.03

Supplementary Tutorial, Slide 35:

The screenshot displays the SPSS software interface. At the top, the menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Window, and Help. Below the menu is a toolbar with various icons for file operations and analysis. The main window shows a data table with 25 rows and 14 columns. The first column is labeled 'rat' and contains values from 1 to 25. The second column is 'Adult_vs_Aged' with values 'Adult' or 'Aged'. The third column is 'injury' with values 'Stroke' or 'Sham'. The fourth column is 'group' with values like 'Young-NT3', 'Aged-NT3', 'Aged-GFP', and 'Aged-NT3'. The remaining columns are labeled 'mean_preop' and 'mean_postop' followed by subscripts 1 through 8. The last column is 'var'. A dialog box titled 'Repeated Measures: Save' is open in the center, showing options for saving predicted values, residuals, diagnostics, and coefficient statistics. The 'Save' button is highlighted. At the bottom, the Windows taskbar shows the Start button and several open applications. The system tray at the bottom right shows the time as 16:40.

rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop_1	mean_postop_2	mean_postop_3	mean_postop_4	mean_postop_5	mean_postop_6	mean_postop_7	mean_postop_8	var
1	Adult	Stroke	Young-NT3	.03	.03	.06	.03	.03	.03	.16	.07	.10	
2	Adult	Sham	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
3	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
4	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
5	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
6	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
7	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
8	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
9	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
10	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
11	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
12	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
13	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
14	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
15	Adult	Sham	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
16	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
17	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
18	Adult	Stroke	Young-NT3	.03	.03	.03	.03	.03	.03	.10	.03	.09	
19	Aged	Stroke	Aged-NT3	.10	.26	.10	.22	.11	.18	.10	.06	.13	
20	Aged	Stroke	Aged-NT3	.10	.20	.15	.13	.13	.07	.17	.10	.23	
21	Aged	Stroke	Aged-NT3	.10	.20	.15	.13	.13	.07	.17	.10	.23	
22	Aged	Stroke	Aged-NT3	.10	.20	.15	.13	.13	.07	.17	.10	.23	
23	Aged	Stroke	Aged-GFP	.03	.20	.33	.30	.29	.14	.10	.13	.39	
24	Aged	Stroke	Aged-NT3	.03	.20	.38	.03	.13	.0	.10	.21	.03	

Supplementary Tutorial, Slide 36

The screenshot displays the SPSS software interface. A data table is visible in the background, and a dialog box titled "Repeated Measures: Options" is open in the foreground.

Data Table (Visible Columns):

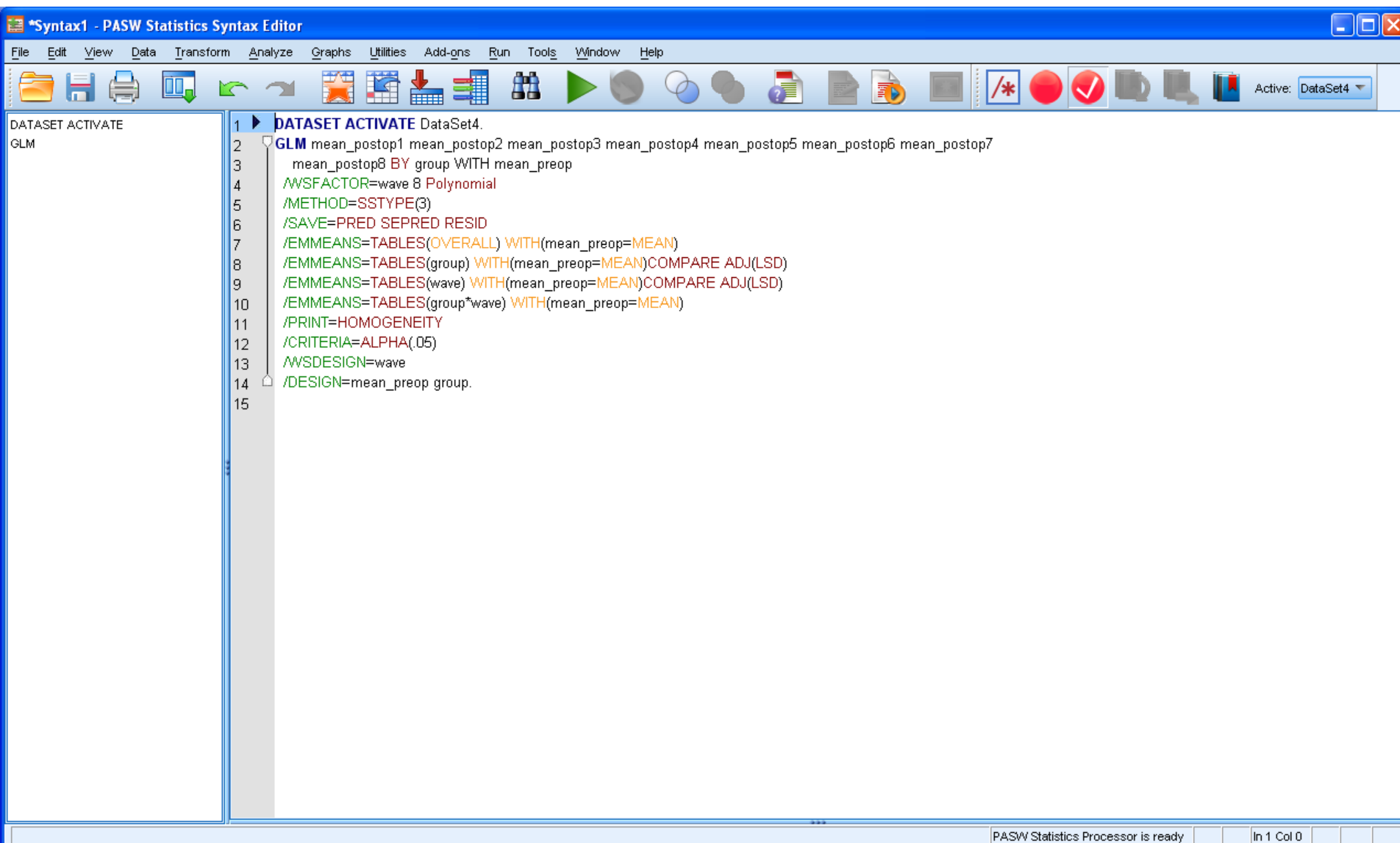
rat	Adult_vs_Aged	injury	group	mean_preop	mean_postop	mean_postop	mean_postop	mean_postop	mean_postop	mean_postop	mean_postop	mean_postop	mean_postop	mean_postop	var
1	1	Adult	Stroke	You											
2	2	Adult	Sham	You											
3	3	Adult	Sham	You											
4	4	Adult	Stroke	You											
5	5	Adult	Stroke	You											
6	6	Adult	Stroke	You											
7	7	Adult	Stroke	You											
8	8	Adult	Stroke	You											
9	9	Adult	Stroke	You											
10	10	Adult	Stroke	You											
11	11	Adult	Stroke	You											
12	12	Adult	Stroke	You											
13	13	Adult	Stroke	You											
14	14	Adult	Stroke	You											
15	15	Adult	Sham	You											
16	16	Adult	Stroke	You											
17	17	Adult	Stroke	You											
18	18	Adult	Stroke	You											
19	19	Aged	Stroke	Ag											
20	21	Aged	Stroke	Ag											
21	22	Aged	Stroke	Aged-NT											
22	23	Aged	Stroke	Aged-NT3	.10	.20	.15	.13	.13	.07	.17	.10	.23		
23	24	Aged	Stroke	Aged-GFP	.03	.20	.33	.30	.29	.14	.10	.13	.39		
24	25	Aged	Stroke	Aged-NT3	.03	.20	.38	.03	.13	.0	.10	.21	.03		

Repeated Measures: Options Dialog Box:

- Estimated Marginal Means:**
 - Factor(s) and Factor Interactions: (OVERALL), group, wave, group*wave
 - Display Means for: (OVERALL), group, wave, group*wave
 - Compare main effects
 - Confidence interval adjustment: LSD(none)
- Display:**
 - Descriptive statistics
 - Estimates of effect size
 - Observed power
 - Parameter estimates
 - SSCP matrices
 - Residual SSCP matrix
 - Transformation matrix
 - Homogeneity tests
 - Spread vs. level plot
 - Residual plot
 - Lack of fit
 - General estimable function
- Significance level: .05 Confidence intervals are 95.0%
- Buttons: Continue, Cancel, Help

The bottom of the screen shows the Windows taskbar with various open applications like Firefox, Word, and PASW Statistics Processor.

Supplementary Tutorial, Slide 37. Here's the Syntax you generated. To obtain pairwise comparisons for the interaction, delete the full stop at the end and add these lines:
/EMMEANS=TABLES(group*wave) WITH(mean_preop=MEAN)COMPARE (group) ADJ(LSD)
/EMMEANS=TABLES(group*wave) WITH(mean_preop=MEAN)COMPARE (wave) ADJ(LSD).



The screenshot shows the PASW Statistics Syntax Editor interface. The main window displays a syntax script for a General Linear Model (GLM) analysis. The script includes the following commands:

```
1 DATASET ACTIVATE DataSet4.  
2 GLM mean_postop1 mean_postop2 mean_postop3 mean_postop4 mean_postop5 mean_postop6 mean_postop7  
3   mean_postop8 BY group WITH mean_preop  
4   /WSFACTOR=wave 8 Polynomial  
5   /METHOD=SSTYPE(3)  
6   /SAVE=PRED SEPRED RESID  
7   /EMMEANS=TABLES(OVERALL) WITH(mean_preop=MEAN)  
8   /EMMEANS=TABLES(group) WITH(mean_preop=MEAN)COMPARE ADJ(LSD)  
9   /EMMEANS=TABLES(wave) WITH(mean_preop=MEAN)COMPARE ADJ(LSD)  
10  /EMMEANS=TABLES(group*wave) WITH(mean_preop=MEAN)  
11  /PRINT=HOMOGENEITY  
12  /CRITERIA=ALPHA(.05)  
13  /WSDESIGN=wave  
14  /DESIGN=mean_preop group.  
15
```

The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Run, Tools, Window, Help), a toolbar with various icons, and a status bar at the bottom indicating "PASW Statistics Processor is ready" and "In 1 Col 0".

Supplementary Tutorial, Slide 38

Ensure there is ONLY one full stop (period), at the end.

Now click Run>All

The screenshot displays the PASW Statistics Syntax Editor window. The title bar reads '*Syntax1 - PASW Statistics Syntax Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Run, Tools, Window, and Help. The toolbar contains various icons for file operations, analysis, and execution. The main editor area shows the following syntax script:

```
1 DATASET ACTIVATE DataSet2.  
2 GLM mean_postop1 mean_postop2 mean_postop3 mean_postop4 mean_postop5 mean_postop6 mean_postop7  
3 mean_postop8 BY group WITH mean_preop  
4 /AWSFACTOR=wave 8 Polynomial  
5 /METHOD=SSTYPE(3)  
6 /EMMEANS=TABLES(OVERALL) WITH(mean_preop=MEAN)  
7 /EMMEANS=TABLES(group) WITH(mean_preop=MEAN)COMPARE ADJ(LSD)  
8 /EMMEANS=TABLES(wave) WITH(mean_preop=MEAN)COMPARE ADJ(LSD)  
9 /EMMEANS=TABLES(group*wave) WITH(mean_preop=MEAN)  
10 /PRINT=HOMOGENEITY  
11 /CRITERIA=ALPHA(.05)  
12 /WSDESIGN=wave  
13 /DESIGN=mean_preop group  
14 /EMMEANS=TABLES(group*wave) WITH(mean_preop=MEAN)COMPARE (group) ADJ(LSD)  
15 /EMMEANS=TABLES(group*wave) WITH(mean_preop=MEAN)COMPARE (wave) ADJ(LSD).  
16
```

The status bar at the bottom indicates 'PASW Statistics Processor is ready' and 'In 16 Col 0'. The Windows taskbar at the very bottom shows the Start button and several open applications: Windows Explorer, Microsoft PowerPoint, PASW Statistics 18, and Firefox. The system clock shows 12:18.

Supplementary Tutorial, Slide 39

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1: rat	1		
	rat	Adult_vs_Aged	injury
1	1	Adult	Stroke
2	2	Adult	Shan
3	3	Adult	Shan
4	4	Adult	Stroke
5	5	Adult	Stroke
6	6	Adult	Stroke
7	7	Adult	Stroke
8	8	Adult	Stroke
9	9	Adult	Stroke
10	10	Adult	Stroke
11	11	Adult	Stroke
12	12	Adult	Stroke
13	13	Adult	Stroke
14	14	Adult	Stroke
15	15	Adult	Shan
16	16	Adult	Stroke
17	17	Adult	Stroke
18	18	Adult	Stroke
19	19	Aged	Stroke
20	21	Aged	Stroke
21	22	Aged	Stroke
22	23	Aged	Stroke
23	24	Aged	Stroke
24	25	Aged	Stroke

Chart Builder

Variables:

- rat
- Adult_vs_Aged
- injury
- group
- mean_preop
- mean_postop1
- mean_postop2
- mean_postop3
- mean_postop4
- mean_postop5
- mean_postop6

Chart preview uses example data

Histogram

Residual for mean_postop1

No variables selected

Gallery Basic Elements Groups/Point ID Titles/Footnotes

Choose from:

- Favorites
- Bar
- Line
- Area
- Pie/Polar
- Scatter/Dot
- Histogram
- High-Low
- Boxplot
- Dual Axes

Element Properties

Edit Properties of:

Bar1

X-Axis1 (Bar1)

Y-Axis1 (Bar1)

Statistics:

Variable: Residual for mean_postop1

Statistic: Histogram

Set Parameters...

Display normal curve

Display error bars

Error Bars Represent

- Confidence intervals
- Level (%): 95
- Standard error
- Multiplier: 2
- Standard deviation
- Multiplier: 2

Bar Style:

Bar

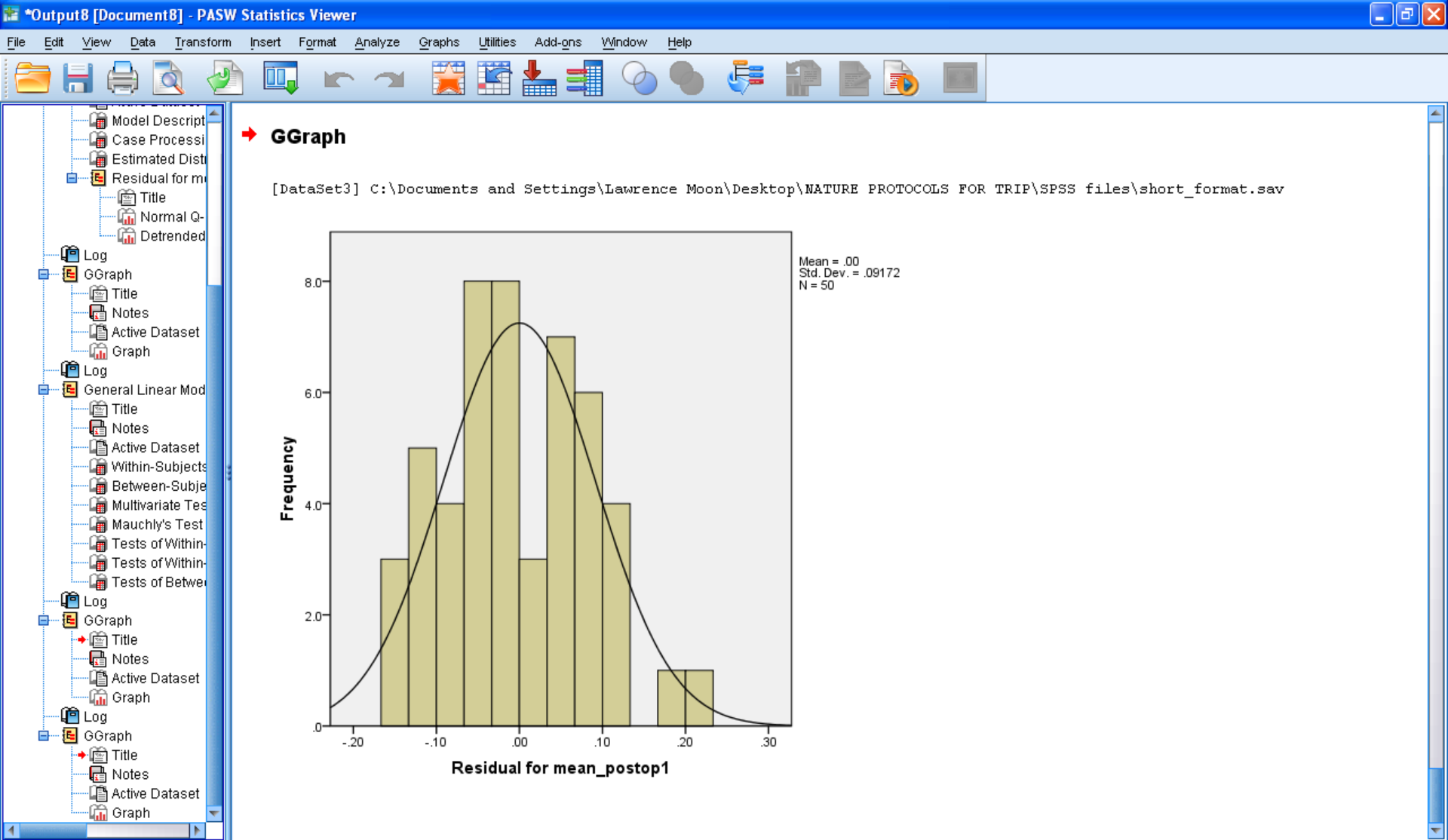
Apply Close Help

Data View Variable View

PASW Statistics Processor is ready

start 3 Mi... Wind... NATU... Durick... 2 Fir... EndN... 3 P... 2 Mi... 2 A... 2 Mi... 16:50

Supplementary Tutorial, Slide 40



Supplementary Tutorial, Slide 41

Between-Subjects Factors

	Value Label	N
group 1.00	Aged-NT3	19
2.00	Aged-GFP	13
3.00	Young-NT3	15
4.00	Sham	3

Box's Test of Equality of Covariance Matrices^a

Box's M	129.567
F	1.299
df1	72
df2	4492.476
Sig.	.047

Tests the null hypothesis that the observed covariance matrices of the

Supplementary Tutorial, Slide 42

***Output12 [Document12] - PASW Statistics Viewer**

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Output

- Log
- General Linear Model
 - Title
 - Notes
 - Active Dataset
 - Within-Subjects F
 - Between-Subjects
 - Box's Test of Equa
 - Multivariate Tests
 - Mauchly's Test of s
 - Tests of Within-Su
 - Tests of Within-Su
 - Levene's Test of E
 - Tests of Between-
 - Estimated Margin
- 1. Grand Mea
- 2. group
 - Title
 - Estimate
 - Pairwise
 - Univariat
- 3. wave
 - Title
 - Estimate
 - Pairwise
 - Multivari
- 4. group * wa
- 5. group * wa
 - Title
 - Estimate
 - Pairwise
 - Univariat

Mauchly's Test of Sphericity^b

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon ^a		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
wave	.675	16.657	2	.940	.905	1.000	.143

Tests the null hypothesis that the error covariance matrix of the orthogonalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b. Design: Intercept + mean_preop + group
Within Subjects Design: wave

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
wave	Sphericity Assumed	.211	7	.030	4.031	.000
	Greenhouse-Geisser	.211	6.337	.033	4.031	.001
	Huynh-Feldt	.211	7.000	.030	4.031	.000
	Lower-bound	.211	1.000	.211	4.031	.051
wave * mean_preop	Sphericity Assumed	.035	7	.005	.660	.706
	Greenhouse-Geisser	.035	6.337	.005	.660	.691
	Huynh-Feldt	.035	7.000	.005	.660	.706
	Lower-bound	.035	1.000	.035	.660	.421
wave * group	Sphericity Assumed	.265	21	.013	1.685	.032
	Greenhouse-Geisser	.265	19.012	.014	1.685	.038
	Huynh-Feldt	.265	21.000	.013	1.685	.032
	Lower-bound	.265	3.000	.088	1.685	.184

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 43

***Output12 [Document12] - PASW Statistics Viewer**

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Output

- Log
- General Linear Model
 - Title
 - Notes
 - Active Dataset
 - Within-Subjects F
 - Between-Subjects F
 - Box's Test of Equi
 - Multivariate Tests
 - Mauchly's Test of
 - Tests of Within-Su
 - Tests of Within-Su
 - Levene's Test of E
 - Tests of Between-
 - Estimated Margin
 - Title
 - 1. Grand Mea
 - 2. group
 - Title
 - Estimate
 - Pairwise
 - Univariat
 - 3. wave
 - Title
 - Estimate
 - Pairwise
 - Multivari
 - 4. group * wa
 - 5. group * wa
 - Title
 - Estimate
 - Pairwise
 - Univariat

Order 5	.269	45	.006
Order 6	.313	45	.007
Order 7	.355	45	.008

Levene's Test of Equality of Error Variances^a

	F	df1	df2	Sig.
mean_postop1	.842	3	46	.478
mean_postop2	3.441	3	46	.024
mean_postop3	5.181	3	46	.004
mean_postop4	3.155	3	46	.034
mean_postop5	5.898	3	46	.002
mean_postop6	3.158	3	46	.033
mean_postop7	2.026	3	46	.123
mean_postop8	7.235	3	46	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + mean_preop + group
Within Subjects Design: wave

Tests of Between-Subjects Effects

Measure: MEASURE_1
Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	3.323	1	3.323	126.128	.000
mean_preop	.004	1	.004	.157	.694
group	1.664	3	.555	21.056	.000
Error	1.185	45	.026		

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 44

Output2 [Document2] - PASW Statistics Viewer

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

General Linear Model

Aged-NT3	.216*	.013	.189	.242
Aged-GFP	.250 ^a	.016	.218	.282
Young-NT3	.106 ^a	.015	.076	.136
Sham	.066 ^a	.033	-.001	.133

a. Covariates appearing in the model are evaluated at the following values: mean_preop = .0468.

Pairwise Comparisons

Measure: MEASURE_1

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
Aged-NT3	Aged-GFP	-.034	.021	.107	-.076	.008
	Young-NT3	.110*	.020	.000	.070	.150
	Sham	.150*	.036	.000	.078	.222
Aged-GFP	Aged-NT3	.034	.021	.107	-.008	.076
	Young-NT3	.144*	.022	.000	.100	.187
	Sham	.184*	.037	.000	.110	.258
Young-NT3	Aged-NT3	-.110*	.020	.000	-.150	-.070
	Aged-GFP	-.144*	.022	.000	-.187	-.100
	Sham	.040	.037	.276	-.033	.114
Sham	Aged-NT3	-.150*	.036	.000	-.222	-.078
	Aged-GFP	-.184*	.037	.000	-.258	-.110
	Young-NT3	-.040	.037	.276	-.114	.033

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

*. The mean difference is significant at the .05 level.

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 45: Scroll down to group * wave and then inspect pairwise comparisons

The screenshot displays the PASW Statistics Viewer interface. The left-hand pane shows a tree view of the analysis structure, with '3. wave' selected under '2. group * wave'. The main window shows a table of pairwise comparisons for the 'wave' variable within the 'group * wave' interaction. The table includes columns for the comparison label, the two groups being compared, and several statistical values including the mean difference, standard error, t-statistic, p-value, and confidence intervals. A green circle highlights the p-value of .009 for the comparison between Aged-GFP and Young-NT3.

Comparison	Group 1	Group 2	Mean Difference	SE	t	p-value	CI Lower	CI Upper
7	Young-NT3	Aged-NT3	.011	.058	.855	.127		
7	Aged-NT3	Aged-GFP	-.043	.026	.107	.096	.010	
	Young-NT3	Sham	.075*	.025	.005	.024	.126	
7	Aged-GFP	Aged-NT3	.043	.026	.107	-.010	.096	
	Young-NT3	Sham	.118*	.028	.000	.062	.174	
7	Young-NT3	Aged-NT3	-.075*	.025	.005	-.126	-.024	
	Aged-GFP	Sham	-.118*	.028	.000	-.174	-.062	
7	Sham	Aged-NT3	.011	.047	.823	-.083	.104	
	Aged-GFP	Aged-NT3	-.085	.046	.068	-.177	.007	
7	Aged-GFP	Aged-GFP	-.129*	.047	.009	-.224	-.034	
	Young-NT3	Sham	-.011	.047	.823	-.104	.083	
8	Aged-NT3	Aged-GFP	-.147*	.038	.000	-.224	-.070	
	Young-NT3	Sham	.110*	.037	.004	.036	.184	
8	Aged-GFP	Aged-NT3	.147*	.038	.000	.070	.224	
	Young-NT3	Sham	.257*	.040	.000	.176	.338	
8	Young-NT3	Aged-NT3	-.110*	.037	.004	-.184	-.036	
	Aged-GFP	Sham	-.257*	.040	.000	-.338	-.176	
8	Sham	Aged-NT3	.008	.067	.904	-.128	.144	
	Aged-NT3	Aged-GFP	-.118	.066	.080	-.251	.015	
8	Aged-GFP	Aged-GFP	-.265*	.068	.000	-.402	-.128	
	Young-NT3	Sham	-.008	.067	.904	-.144	.128	

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

*. The mean difference is significant at the .05 level.

Supplementary Tutorial, Slide 46. Make sure you downloaded and unzipped the “Supplementary Data 1” file from Nature Protocols or from www.lawrencemoon.co.uk/resources/mixedmodels.asp

File>Open> “long_format.sav”

Analyze>Mixed Models>Linear

The screenshot shows the SPSS (PASW Statistics Processor) interface. The 'Analyze' menu is open, and the path 'Mixed Models' > 'Linear...' is selected. The background data table is partially visible, showing columns for 'rat', 'Adult', 'mean_prep', 'wave', and 'outcome'. The status bar at the bottom indicates 'Linear...' and 'PASW Statistics Processor is ready'.

Case #	rat	Adult	mean_prep	wave	outcome
1	1				
2	1				
3	1				
4	1				
5	1				
6	1				
7	1				
8	1				
9	2				
10	2				
11	2				
12	2				
13	2				
14	2				
15	2				
16	2				
17	3				
18	3	Adult	Sham	Sham	.06
19	3	Adult	Sham	Sham	.06
20	3	Adult	Sham	Sham	.06
21	3	Adult	Sham	Sham	.06
22	3	Adult	Sham	Sham	.06
23	3	Adult	Sham	Sham	.06
24	3	Adult	Sham	Sham	.06
25	4	Adult	Stroke	Young-NT3	0

Supplementary Tutorial, Slide 47 and Figure 3

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1: rat 1 Visible: 7 of 7 Variables

	rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	var	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18							
2	1	Adult	Stroke	Young-NT3										
3	1	Adult	Stroke	Young-NT3										
4	1	Adult	Stroke	Young-NT3										
5	1	Adult	Stroke	Young-NT3										
6	1	Adult	Stroke	Young-NT3										
7	1	Adult	Stroke	Young-NT3										
8	1	Adult	Stroke	Young-NT3										
9	2	Adult	Sham	Sham										
10	2	Adult	Sham	Sham										
11	2	Adult	Sham	Sham										
12	2	Adult	Sham	Sham										
13	2	Adult	Sham	Sham										
14	2	Adult	Sham	Sham										
15	2	Adult	Sham	Sham										
16	2	Adult	Sham	Sham										
17	3	Adult	Sham	Sham										
18	3	Adult	Sham	Sham										
19	3	Adult	Sham	Sham										
20	3	Adult	Sham	Sham										
21	3	Adult	Sham	Sham										
22	3	Adult	Sham	Sham	.06									
23	3	Adult	Sham	Sham	.06									
24	3	Adult	Sham	Sham	.06									
25	4	Adult	Stroke	Young-NT3	.0									

Linear Mixed Models: Specify Subjects and Repeated

Click Continue for models with uncorrelated terms.
Specify Subject variable for models with correlated random effects.
Specify both Repeated and Subject variables for models with correlated residuals within the random effects.

Subjects:
Adult_vs_Aged
injury
group
mean_preop
outcome

Repeated:
wave

Repeated Covariance Type: Compound Symmetry

- Ante-Dependence: First Order
- AR(1)
- AR(1): Heterogeneous
- ARMA(1,1)
- Compound Symmetry
- Compound Symmetry: Correlation Metric
- Compound Symmetry: Heterogeneous
- Diagonal

Continue

Data View Variable View

PASW Statistics Processor is ready

start 4 Mi... Windo... 3 Wi... 2 Fir... 2 Ad... NP-P1... Nat Pr... EndN... 3 PA... 20:37

Supplementary Tutorial, Slide 48 and Figure 3

The image shows the SPSS Linear Mixed Models dialog box overlaid on a data table. The dialog box is configured with the following settings:

- Dependent Variable:** outcome
- Factor(s):** wave, group
- Covariate(s):** mean_preop
- Residual Weight:** (empty)

The data table below shows the variables and their values for 25 rows:

rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	var	var	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18							
2	1	Adult	Stroke	Young-NT3	.0	2	.16							
3	1	Adult	Stroke	Young-NT3	.0	3	.10							
4	1	Adult	Stroke	Young-NT3	.0	4	.07							
5	1	Adult	Stroke	Young										
6	1	Adult	Stroke	Young										
7	1	Adult	Stroke	Young										
8	1	Adult	Stroke	Young										
9	2	Adult	Sham	S										
10	2	Adult	Sham	S										
11	2	Adult	Sham	S										
12	2	Adult	Sham	S										
13	2	Adult	Sham	S										
14	2	Adult	Sham	S										
15	2	Adult	Sham	S										
16	2	Adult	Sham	S										
17	3	Adult	Sham	S										
18	3	Adult	Sham	S										
19	3	Adult	Sham	Sham	.06	3	.10							
20	3	Adult	Sham	Sham	.06	4	.03							
21	3	Adult	Sham	Sham	.06	5	.03							
22	3	Adult	Sham	Sham	.06	6	.0							
23	3	Adult	Sham	Sham	.06	7	.03							
24	3	Adult	Sham	Sham	.06	8	.0							
25	4	Adult	Stroke	Young-NT3	.0	1	.25							

Supplementary Tutorial, Slide 49 and Figure 4

The screenshot displays the SPSS Statistics interface. The background shows a data table with columns: rat, Adult_vs_Aged, injury, group, mean_preop, wave, outcome, FXPRED_1, PRED_1, RESID_1, FXPRED_2, and PREI. The data rows range from 130 to 154. A dialog box titled "Linear Mixed Models: Fixed Effects" is open in the foreground. The dialog has two radio buttons: "Build terms" (selected) and "Build nested terms". Under "Factors and Covariates", the variables "wave", "group", and "mean_preop" are listed. A "Factorial" dropdown menu is set to "Factorial". The "Model" list contains: wave, group, wave*group, mean_preop, wave*mean_preop, group*mean_preop, and wave*group*mean_preop. At the bottom, "Include intercept" is checked, and "Sum of squares" is set to "Type III". Buttons for "Continue", "Cancel", and "Help" are visible.

rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	FXPRED_1	PRED_1	RESID_1	FXPRED_2	PREI
130	17	Adult	Stroke	Young-NT3	13	2	0	1317	1317	-.1317	.1317
131	17	Adult	Stroke	Young-NT3	13	2	0	1317	1317	-.0641	.1241
132	17	Adult	Stroke	Young-NT3	13	2	0	1317	1317	-.0264	.1264
133	17	Adult	Stroke	Young-NT3	13	2	0	1317	1317	-.0837	.0837
134	17	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.0227	.0773
135	17	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.0089	.0911
136	17	Adult	Stroke	Young-NT3	13	2	0	1317	1317	-.0251	.0551
137	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.1989	.2411
138	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.0375	.1225
139	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.0252	.1148
140	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.0229	.1171
141	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	-.0045	.0745
142	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	-.0380	.0680
143	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.0382	.0818
144	18	Adult	Stroke	Young-NT3	13	2	0	1317	1317	.1142	.0458
145	19	Aged	Stroke	Young-NT3	13	2	0	1317	1317	-.0621	.3221
146	19	Aged	Stroke	Young-NT3	13	2	0	1317	1317	-.1041	.2741
147	19	Aged	Stroke	Young-NT3	13	2	0	1317	1317	-.0541	.2441
148	19	Aged	Stroke	Young-NT3	13	2	0	1317	1317	.0564	.1936
149	19	Aged	Stroke	Young-NT3	13	2	0	1317	1317	.0069	.1931
150	19	Aged	Stroke	Young-NT3	13	2	0	1317	1317	.3204	.1796
151	19	Aged	Stroke	Aged-NT3	.04	7	.13	.1523	.1523	-.0223	.1523
152	19	Aged	Stroke	Aged-NT3	.04	8	.10	.1544	.1544	-.0544	.1544
153	21	Aged	Stroke	Aged-NT3	.13	1	.42	.3341	.3341	.0859	.3341
154	21	Aged	Stroke	Aged-NT3	.13	2	.46	.2861	.2861	.1739	.2861

Supplementary Tutorial, Slide 50 and Figure 4

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1: rat 1

	rat	Adult_vs_Aged	injury	group	mean
130	17	Adult	Stroke	Young-NT3	
131	17	Adult	Stroke	Young-NT3	
132	17	Adult	Stroke	Young-NT3	
133	17	Adult	Stroke	Young-NT3	
134	17	Adult	Stroke	Young-NT3	
135	17	Adult	Stroke	Young-NT3	
136	17	Adult	Stroke	Young-NT3	
137	18	Adult	Stroke	Young-NT3	
138	18	Adult	Stroke	Young-NT3	
139	18	Adult	Stroke	Young-NT3	
140	18	Adult	Stroke	Young-NT3	
141	18	Adult	Stroke	Young-NT3	
142	18	Adult	Stroke	Young-NT3	
143	18	Adult	Stroke	Young-NT3	
144	18	Adult	Stroke	Young-NT3	
145	19	Aged	Stroke	Aged-NT3	
146	19	Aged	Stroke	Aged-NT3	
147	19	Aged	Stroke	Aged-NT3	
148	19	Aged	Stroke	Aged-NT3	
149	19	Aged	Stroke	Aged-NT3	
150	19	Aged	Stroke	Aged-NT3	
151	19	Aged	Stroke	Aged-NT3	
152	19	Aged	Stroke	Aged-NT3	
153	21	Aged	Stroke	Aged-NT3	
154	21	Aged	Stroke	Aged-NT3	

Linear Mixed Models: Estimation

Method

Restricted Maximum Likelihood (REML)
 Maximum Likelihood (ML)

Iterations

Maximum iterations: 100
 Maximum step-halvings: 5
 Print iteration history for every 1 step(s)

Log-Likelihood Convergence

Absolute Relative
 Value 0

Parameter Convergence

Absolute Relative
 Value 0.000001

Hessian Convergence

Absolute Relative
 Value 0

Maximum scoring steps: 1
 Singularity tolerance: 0.000000000001

Continue Cancel Help

Visible: 7 of 7 Variables

Data View Variable View

Supplementary Tutorial, Slide 51 and Figure 5

The screenshot shows the SPSS Linear Mixed Models: EM Means dialog box. The background is a data view with columns 'rat', 'Adult_vs_Aged', and 'inju'. The dialog box is titled 'Linear Mixed Models: EM Means' and contains the following settings:

- Estimated Marginal Means of Fitted Models
- Factors(s) and Factor Interactions: (OVERALL), wave, group, wave*group
- Display Means for: (OVERALL), wave, group, wave*group
- Compare main effects
- Confidence Interval Adjustment: LSD(none)
- Reference Category: None (all pairwise), First, Last, Custom (Value:)
- Buttons: Continue, Cancel, Help

rat	Adult_vs_Aged	inju
1	1	Adult
2	1	Adult
3	1	Adult
4	1	Adult
5	1	Adult
6	1	Adult
7	1	Adult
8	1	Adult
9	2	Adult
10	2	Adult
11	2	Adult
12	2	Adult
13	2	Adult
14	2	Adult
15	2	Adult
16	2	Adult
17	3	Adult
18	3	Adult
19	3	Adult
20	3	Adult
21	3	Adult
22	3	Adult
23	3	Adult
24	3	Adult
25	4	Adult

Supplementary Tutorial, Slide 52 and Figure 5

The screenshot displays the SPSS software interface. At the top, the menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Window, and Help. Below the menu bar is a toolbar with various icons for file operations and analysis. The main window shows a data table with the following columns: rat, Adult_vs_Aged, injury, group, mean_preop, wave, outcome, and several empty columns labeled 'var'. The data rows are numbered 1 through 25. A dialog box titled 'Linear Mixed Models' is open in the foreground, showing the following options:

- Fixed Predicted Values:**
 - Predicted values
 - Standard errors
 - Degrees of freedom
- Predicted Values & Residuals:**
 - Predicted values
 - Standard errors
 - Degrees of freedom
 - Residuals

Buttons for 'Fixed...', 'Random...', 'Estimation...', 'Statistics...', 'EM Means...', and 'Save...' are visible on the right side of the dialog box. The 'Continue', 'Cancel', and 'Help' buttons are at the bottom. The status bar at the bottom of the SPSS window indicates 'PASW Statistics Processor is ready'.

	rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	var	var	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18								
2	1	Adult	Stroke	Young-NT3	.0	2	.16								
3	1	Adult	Stroke	Young-NT3	.0	3	.10								
4	1	Adult	Stroke	Young-NT3	.0	4	.07								
5	1	Adult	Stroke	Young											
6	1	Adult	Stroke	Young											
7	1	Adult	Stroke	Young											
8	1	Adult	Stroke	Young											
9	2	Adult	Sham	S											
10	2	Adult	Sham	S											
11	2	Adult	Sham	S											
12	2	Adult	Sham	S											
13	2	Adult	Sham	S											
14	2	Adult	Sham	S											
15	2	Adult	Sham	S											
16	2	Adult	Sham	S											
17	3	Adult	Sham	S											
18	3	Adult	Sham	S											
19	3	Adult	Sham	Sham	.06	3	.10								
20	3	Adult	Sham	Sham	.06	4	.03								
21	3	Adult	Sham	Sham	.06	5	.03								
22	3	Adult	Sham	Sham	.06	6	.0								
23	3	Adult	Sham	Sham	.06	7	.03								
24	3	Adult	Sham	Sham	.06	8	.0								
25	4	Adult	Stroke	Young-NT3	.0	1	.06								

Supplementary Tutorial, Slide 53:

The screenshot displays the PASW Statistics Syntax Editor interface. The title bar reads '*Syntax1 - PASW Statistics Syntax Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Run, Tools, Window, and Help. The toolbar contains various icons for file operations and analysis. The main editor area shows a syntax script for a mixed-effects model. The left pane shows a project tree with 'DATASET ACTIVATE' and 'MIXED' folders. The status bar at the bottom indicates 'PASW Statistics Processor is ready', 'In 13 Col 40', and 'CAP'.

```
1 DATASET ACTIVATE DataSet3.  
2  
3 MIXED outcome BY group wave WITH mean_preop  
4 /CRITERIA=CIN(95) MXITER(100) MXSTEP(5) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0,  
5 ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)  
6 /FIXED=group wave mean_preop group*wave group*mean_preop wave*mean_preop group*wave*mean_preop |  
7 SSTYPE(3)  
8 /METHOD=REML  
9 /REPEATED=wave | SUBJECT(rat) COVTYPE(CS)  
10 /SAVE=FIXPRED PRED RESID  
11 /EMMEANS=TABLES(OVERALL)  
12 /EMMEANS=TABLES(group) COMPARE ADJ(LSD)  
13 /EMMEANS=TABLES(wave) COMPARE ADJ(LSD)  
14 /EMMEANS=TABLES(group*wave) .  
15
```

Supplementary Tutorial, Slide 54 and Figure 6

The screenshot displays the PASW Statistics Syntax Editor interface. The title bar reads '*Syntax1 - PASW Statistics Syntax Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Run, Tools, Window, and Help. The toolbar contains various icons for file operations, navigation, and execution. The main editing area shows a syntax script for a mixed-effects model. The script starts with 'DATASET ACTIVATE DataSet3.' followed by a 'MIXED' procedure. The dependent variable is 'outcome', and the independent variables are 'group' and 'wave'. The model is fitted using REML. The syntax includes options for convergence criteria, fixed effects, and multiple tables of estimated marginal means (EMMEANS) for overall, group, wave, and group*wave interactions, each with a comparison to the overall mean using the LSD method. The status bar at the bottom indicates 'PASW Statistics Processor is ready' and 'In 16 Col 2'. The Windows taskbar at the very bottom shows the Start button and several open applications.

```
1 DATASET ACTIVATE DataSet3.  
2  
3 MIXED outcome BY group wave WITH mean_preop  
4 /CRITERIA=CIN(95) MXITER(100) MXSTEP(5) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0,  
5 ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)  
6 /FIXED=group wave mean_preop group*wave group*mean_preop wave*mean_preop group*wave*mean_preop |  
7 SSTYPE(3)  
8 /METHOD=REML  
9 /REPEATED=wave | SUBJECT(rat) COVTYPE(CS)  
10 /SAVE=FIXPRED PRED RESID  
11 /EMMEANS=TABLES(OVERALL)  
12 /EMMEANS=TABLES(group) COMPARE ADJ(LSD)  
13 /EMMEANS=TABLES(wave) COMPARE ADJ(LSD)  
14 /EMMEANS=TABLES(group*wave)  
15 /EMMEANS=TABLES(group*wave) COMPARE (group) ADJ(LSD)  
16 /EMMEANS=TABLES(group*wave) COMPARE (wave) ADJ(LSD).  
17  
18
```

Supplementary Tutorial, Slide 55: Analysis using linear model and a Compound Symmetric covariance structure and estimated using REML

*Output2 [Document2] - PASW Statistics Viewer

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

→ **Mixed Model Analysis**

[DataSet3] C:\Documents and Settings\Lawrence Moon\Desktop\NATURE PROTOCOLS FOR TRIP\SPSS files\long_format.sav

Model Dimension^a

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables	Number of Subjects
Fixed Effects	Intercept	1		1		
	group	4		3		
	wave	8		7		
	mean_preop	1		1		
	group * wave	32		21		
	group * mean_preop	4		3		
	wave * mean_preop	8		7		
Repeated Effects	group * wave * mean_preop	32		21		
	wave	8	Compound Symmetry	2	rat	53
	Total	98		66		

a. Dependent Variable: outcome.

Information Criteria^a

-2 Restricted Log Likelihood	-711.131
Akaike's Information Criterion (AIC)	-707.131
Hurvich and Tsai's Criterion (AICC)	-707.097
Bozdogan's Criterion (CAIC)	-697.398
Schwarz's Bayesian Criterion (BIC)	-699.398

The information criteria are displayed

Supplementary Tutorial, Slide 56

*Output7 [Document7] - PASW Statistics Viewer

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Log
Mixed Model Analysis
Title
Notes
Active Dataset
Model Dimensionality
Information Criteria
Fixed Effects
Title
Type III Tests
Covariance Parameters
Title
Estimates
Estimated Marginal Means
Title
1. Grand Mean
2. wave
Title
Estimate
Pairwise
Univariate
3. group
Title
Estimate
Pairwise
Univariate
4. wave * group
5. wave * group * wave
Title
Estimate
Pairwise
Univariate
6. wave * group * wave * group
Title
Estimate
Pairwise
Univariate

a. Dependent Variable: outcome.

Fixed Effects

Type III Tests of Fixed Effects^a

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	44.719	49.791	.000
wave	7	43.734	2.643	.023
group	3	44.921	10.298	.000
wave * group	21	43.975	.510	.951
mean_preop	1	44.844	.084	.773
wave * mean_preop	7	43.883	.548	.794
group * mean_preop	3	45.387	.058	.981
wave * group * mean_preop	21	44.834	.663	.845

a. Dependent Variable: outcome.

Covariance Parameters

Estimates of Covariance Parameters^a

Parameter	Estimate	Std. Error
Repeated Measures UN (1,1)	.009506	.002004
UN (2,1)	.004106	.001690
UN (2,2)	.011745	.002476
UN (3,1)	.002102	.001664
UN (3,2)	.004192	.001922
UN (3,3)	.012650	.002667
UN (4,1)	.002781	.001520
UN (4,2)	.002015	.001653

PASW Statistics Processor is ready

start 3 Micr... Windo... NATUR... 2 Micr... 2 Fire... EndNot... 3 PAS... 2 Micr... Linear ... 15:33

Supplementary Tutorial, Slide 57: Comparing -2LL from two different models

The screenshot shows the SPSS (PASW Statistics Processor) interface. The 'Transform' menu is open, displaying various options such as 'Compute Variable...', 'Count Values within Cases...', 'Shift Values...', 'Recode into Same Variables...', 'Recode into Different Variables...', 'Automatic Recode...', 'Visual Binning...', 'Optimal Binning...', 'Prepare Data for Modeling', 'Rank Cases...', 'Date and Time Wizard...', 'Create Time Series...', 'Replace Missing Values...', 'Random Number Generators...', and 'Run Pending Transforms'. The background data view table is partially visible, showing columns for 'mean_prep', 'wave', 'outcome', and several 'var' columns. The table contains 25 rows of data.

	mean_prep	wave	outcome	var	var	var	var	var	var	var	var	var
1	.0	1	.18									
2	.0	2	.16									
3	.0	3	.10									
4	.0	4	.07									
5	.0	5	.03									
6	.0	6	.06									
7	.0	7	.03									
8	.0	8	.03									
9	.10	1	.09									
10	.10	2	.07									
11	.10	3	.06									
12	.10	4	.07									
13	.10	5	.03									
14	.10	6	.16									
15	.10	7	.07									
16	.10	8	.10									
17	.06	1	.03									
18	.06	2	.06									
19	.06	3	.10									
20	.06	4	.03									
21	.06	5	.03									
22	.06	6	.0									
23	.06	7	.03									
24	.06	8	.0									
25	.0	1	.06									

Supplementary Tutorial, Slide 58: Comparing -2LL from two different models

The screenshot displays the SPSS 'Compute Variable' dialog box. The 'Target Variable' is 'Improvement' and the 'Numeric Expression' is '1-CDF.CHISQ(27,34)'. The 'Function group' is 'CDF & Noncentral CDF' and the selected function is 'Cdf.Chisq'. The background shows a data grid with columns 'rat', 'Adult_vs_Aged', and 'inj'.

rat	Adult_vs_Aged	inj
1	1	Adult
2	1	Adult
3	1	Adult
4	1	Adult
5	1	Adult
6	1	Adult
7	1	Adult
8	1	Adult
9	2	Adult
10	2	Adult
11	2	Adult
12	2	Adult
13	2	Adult
14	2	Adult
15	2	Adult
16	2	Adult
17	3	Adult
18	3	Adult
19	3	Adult
20	3	Adult
21	3	Adult
22	3	Adult
23	3	Adult
24	3	Adult
25	4	Adult

Visible: 7 of 7 Variables

Function group:
All
Arithmetic
CDF & Noncentral CDF
Conversion
Current Date/Time
Date Arithmetic
Date Creation

Functions and Special Variables:
Cdf.Bernoulli
Cdf.Beta
Cdf.Binom
Cdf.Bynor
Cdf.Cauchy
Cdf.Chisq
Cdf.Exp
Cdf.F
Cdf.Gamma
Cdf.Geom
Cdf.Halfnm

if... (optional case selection condition)

OK Paste Reset Cancel Help

Supplementary Tutorial, Slide 59: Comparing -2LL from two different models

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1: Improvement .79754546430483 Visible: 8 of 8 Variables

	rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	Improvement	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18	.80						
2	1	Adult	Stroke	Young-NT3	.0	2	.16	.80						
3	1	Adult	Stroke	Young-NT3	.0	3	.10	.80						
4	1	Adult	Stroke	Young-NT3	.0	4	.07	.80						
5	1	Adult	Stroke	Young-NT3	.0	5	.03	.80						
6	1	Adult	Stroke	Young-NT3	.0	6	.06	.80						
7	1	Adult	Stroke	Young-NT3	.0	7	.03	.80						
8	1	Adult	Stroke	Young-NT3	.0	8	.03	.80						
9	2	Adult	Sham	Sham	.10	1	.09	.80						
10	2	Adult	Sham	Sham	.10	2	.07	.80						
11	2	Adult	Sham	Sham	.10	3	.06	.80						
12	2	Adult	Sham	Sham	.10	4	.07	.80						
13	2	Adult	Sham	Sham	.10	5	.03	.80						
14	2	Adult	Sham	Sham	.10	6	.16	.80						
15	2	Adult	Sham	Sham	.10	7	.07	.80						
16	2	Adult	Sham	Sham	.10	8	.10	.80						
17	3	Adult	Sham	Sham	.06	1	.03	.80						
18	3	Adult	Sham	Sham	.06	2	.06	.80						
19	3	Adult	Sham	Sham	.06	3	.10	.80						
20	3	Adult	Sham	Sham	.06	4	.03	.80						
21	3	Adult	Sham	Sham	.06	5	.03	.80						
22	3	Adult	Sham	Sham	.06	6	.0	.80						
23	3	Adult	Sham	Sham	.06	7	.03	.80						
24	3	Adult	Sham	Sham	.06	8	.0	.80						
25	4	Adult	Stroke	Young-NT3	.0	1	.25	.80						

Data View Variable View

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 60 and Figure 7: Analysis using linear model and CS covariance structure estimated using REML

Fixed Effects

Type III Tests of Fixed Effects^a

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	47.908	131.126	.000
wave	7	336.463	6.797	.000
group	3	48.011	23.637	.000
wave * group	21	336.633	1.600	.047
mean_preop	1	48.599	.607	.440

a. Dependent Variable: outcome.

Covariance Parameters

Estimates of Covariance Parameters^a

Parameter	Estimate	Std. Error
Repeated Measures CS diagonal offset	.007501	.000579
CS covariance	.002281	.000664

a. Dependent Variable: outcome.

Estimated Marginal Means

1. Grand Mean^b

Mean	Std. Error	df	95% Confidence Interval	
			Lower Bound	Upper Bound
.161 ^a	.010	47.822	.140	.182

Supplementary Tutorial, Slide 61 and Figure 7

***Output3 [Document3] - PASW Statistics Viewer**

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Log
Mixed Model Analysis
Title
Notes
Active Dataset
Model Dimensionality
Information Criteria
Fixed Effects
Title
Type III Tests
Covariance Parameters
Title
Estimates
Estimated Marginal Means
Title
1. Grand Means
2. wave
Title
Estimate
Pairwise Comparisons
Univariate Tests
3. group
Title
Estimate
Pairwise Comparisons
Univariate Tests
4. wave * group
Title
Estimate
Pairwise Comparisons
Univariate Tests
5. group * wave
Title
Estimate
Pairwise Comparisons
Univariate Tests
6. group * wave

AgeG-GFP	.257 [*]	.015	48.903	.221	.281
Young-NT3	.107 [*]	.015	47.624	.077	.136
Sham	.065 [*]	.033	47.623	-.001	.131

a. Covariates appearing in the model are evaluated at the following values:
mean_preop = .0485.

b. Dependent Variable: outcome.

Pairwise Comparisons^b

(I) group	(J) group	Mean Difference (I-J)	Std. Error	df	Sig. ^a	95% Confidence Interval for Difference ^a	
						Lower Bound	Upper Bound
Aged-NT3	Aged-GFP	-.042 [*]	.020	48.531	.039	-.081	-.002
	Young-NT3	.109 [*]	.019	47.798	.000	.070	.148
	Sham	.150 [*]	.035	47.671	.000	.079	.221
Aged-GFP	Aged-NT3	.042 [*]	.020	48.531	.039	.002	.081
	Young-NT3	.150 [*]	.021	48.230	.000	.108	.192
	Sham	.192 [*]	.036	47.889	.000	.119	.264
Young-NT3	Aged-NT3	-.109 [*]	.019	47.798	.000	-.148	-.070
	Aged-GFP	-.150 [*]	.021	48.230	.000	-.192	-.108
	Sham	.042	.036	47.628	.255	-.031	.114
Sham	Aged-NT3	-.150 [*]	.035	47.671	.000	-.221	-.079
	Aged-GFP	-.192 [*]	.036	47.889	.000	-.264	-.119
	Young-NT3	-.042	.036	47.628	.255	-.114	.031

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

b. Dependent Variable: outcome.

Univariate Tests^a

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 62

*Output3 [Document3] - PASW Statistics Viewer

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Model Analysis
 Title
 Notes
 Active Dataset
 Model Dimension
 Information Criteria
 Fixed Effects
 Title
 Type III Tests of Fixed Effects
 Covariance Parameters
 Title
 Estimates of Covariance Par
 Estimated Marginal Means
 Title
 1. Grand Mean
 2. wave
 Title
 Estimates
 Pairwise Comparisons
 Univariate Tests
 3. group
 Title
 Estimates
 Pairwise Comparisons
 Univariate Tests
 4. wave * group
 5. group * wave
 Title
 Estimates
 Pairwise Comparisons
 Univariate Tests
 6. group * wave
 Title
 Estimates
 Pairwise Comparisons
 Univariate Tests

7	Aged-NT3	Aged-GFP	-.048	.035	293.544	.171	-.118	.021
		Young-NT3	.073*	.034	280.688	.033	.006	.140
		Sham	.089	.061	277.155	.150	-.032	.210
	Aged-GFP	Aged-NT3	.048	.035	293.544	.171	-.021	.118
		Young-NT3	.122*	.037	286.931	.001	.048	.195
		Sham	.137*	.063	281.456	.031	.013	.262
	Young-NT3	Aged-NT3	-.073*	.034	280.688	.033	-.140	-.006
		Aged-GFP	-.122*	.037	286.931	.001	-.195	-.048
		Sham	.016	.063	275.252	.804	-.108	.139
	Sham	Aged-NT3	-.089	.061	277.155	.150	-.210	.032
		Aged-GFP	-.137*	.063	281.456	.031	-.262	-.013
		Young-NT3	-.016	.063	275.252	.963	-.139	.108
8	Aged-NT3	Aged-GFP	-.153*	.035	293.544	.000	-.222	-.083
		Young-NT3	.111*	.034	280.688	.001	.044	.178
		Sham	.114	.061	277.155	.064	-.007	.235
	Aged-GFP	Aged-NT3	.153*	.035	293.544	.000	.083	.222
		Young-NT3	.264*	.037	286.931	.000	.190	.337
		Sham	.267*	.063	281.456	.000	.142	.391
	Young-NT3	Aged-NT3	-.111*	.034	280.688	.001	-.178	-.044
		Aged-GFP	-.264*	.037	286.931	.000	-.337	-.190
		Sham	.003	.063	275.252	.963	-.120	.126
	Sham	Aged-NT3	-.114	.061	277.155	.064	-.235	.007
		Aged-GFP	-.267*	.063	281.456	.000	-.391	-.142
		Young-NT3	-.003	.063	275.252	.963	-.126	.120

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

*. The mean difference is significant at the .05 level.

b. Dependent Variable: outcome.

Pivot table is visible

PASW Statistics Processor is ready H: 2243, W: 710 pt.

Supplementary Tutorial, Slide 63

The screenshot displays the SPSS software interface. On the left, a data table is visible with columns for 'rat', 'Adult_vs_Aged', and 'injury'. The 'Chart Builder' dialog box is open, showing a list of variables on the left and a histogram preview on the right. The 'Element Properties' dialog box is also open, showing settings for the histogram, including the variable 'Residuals', the statistic 'Histogram', and the option to 'Display normal curve'. The 'Data View' tab is selected at the bottom of the window.

1	rat	Adult_vs_Aged	injury
1	1	Adult	Strok
2	1	Adult	Strok
3	1	Adult	Strok
4	1	Adult	Strok
5	1	Adult	Strok
6	1	Adult	Strok
7	1	Adult	Strok
8	1	Adult	Strok
9	2	Adult	Sha
10	2	Adult	Sha
11	2	Adult	Sha
12	2	Adult	Sha
13	2	Adult	Sha
14	2	Adult	Sha
15	2	Adult	Sha
16	2	Adult	Sha
17	3	Adult	Sha
18	3	Adult	Sha
19	3	Adult	Sha
20	3	Adult	Sha
21	3	Adult	Sha
22	3	Adult	Sha
23	3	Adult	Sha
24	3	Adult	Sha
25	4	Adult	Strok

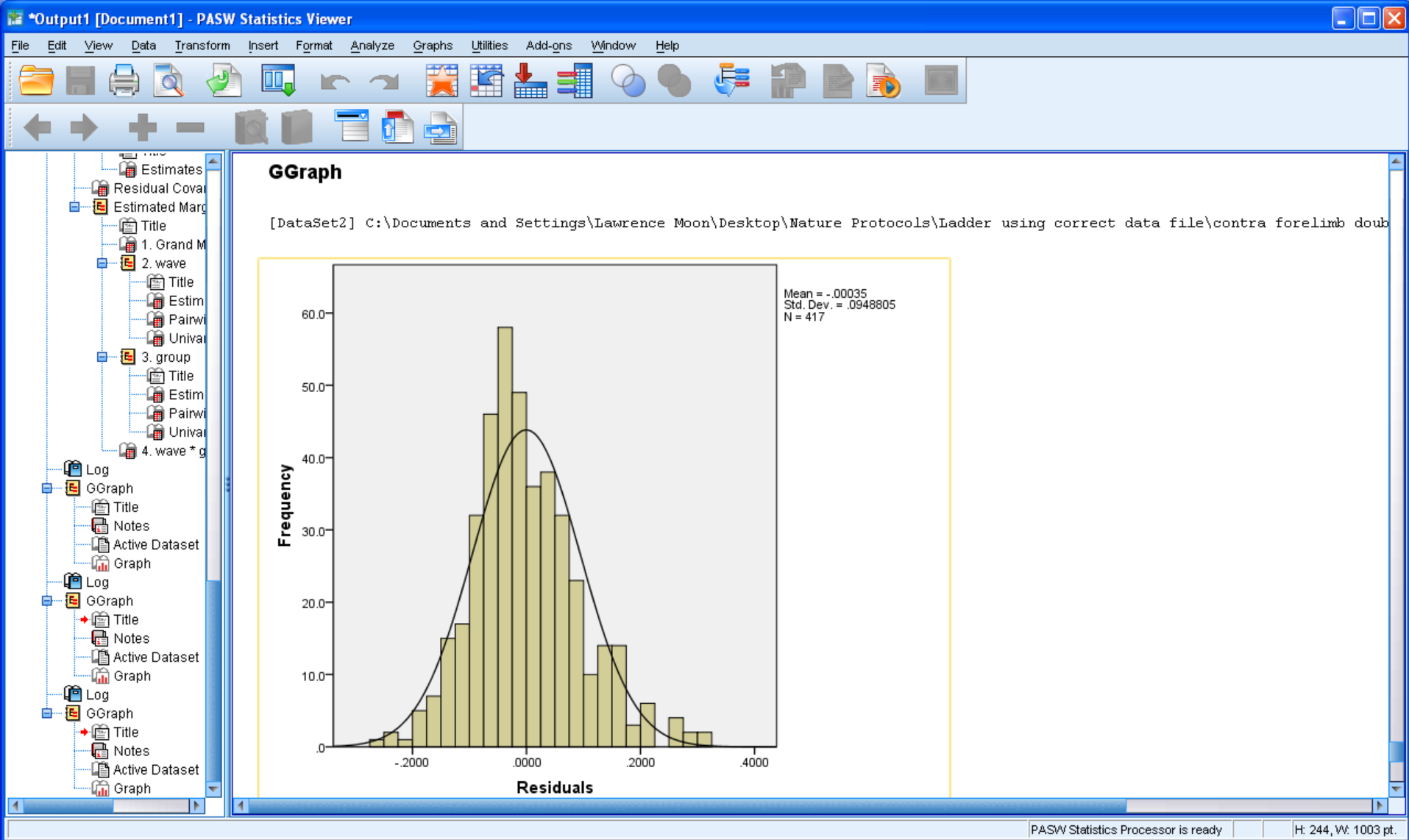
Chart Builder Dialog:

- Variables: rat, Adult_vs_Aged, injury, group, mean_preop, wave, outcome, Fixed Predicted Values..., Predicted Values [PRE...], Residuals [RESID_1]
- Chart preview uses example data
- Chart type: Histogram
- Residuals
- Buttons: OK, Paste, Reset, Cancel, Help

Element Properties Dialog:

- Edit Properties of: Bar1
- X-Axis1 (Bar1)
- Y-Axis1 (Bar1)
- Statistics: Variable: Residuals, Statistic: Histogram, Set Parameters...
- Display normal curve
- Display error bars
- Error Bars Represent:
 - Confidence intervals (Level (%): 95)
 - Standard error (Multiplier: 2)
 - Standard deviation (Multiplier: 2)
- Bar Style: Bar
- Buttons: Apply, Close, Help

Supplementary Tutorial, Slide 64



Supplementary Tutorial, Slide 65

The screenshot shows the PASW Statistics Viewer interface. The left pane displays a tree view of the output, with 'NPar Tests' selected. The main window shows the following text:

```
GET
  FILE='C:\Documents and Settings\Lawrence Moon\Desktop\Nature Protocols\Ladder using correct data file\contra forelimb double checked FINAL_1 long format with residuals.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
NPAR TESTS
      /K-S(NORMAL)= RESID_1
      /MISSING ANALYSIS.
```

→ **NPar Tests**

[DataSet1] C:\Documents and Settings\Lawrence Moon\Desktop\Nature Protocols\Ladder using correct data file\contra forelimb double

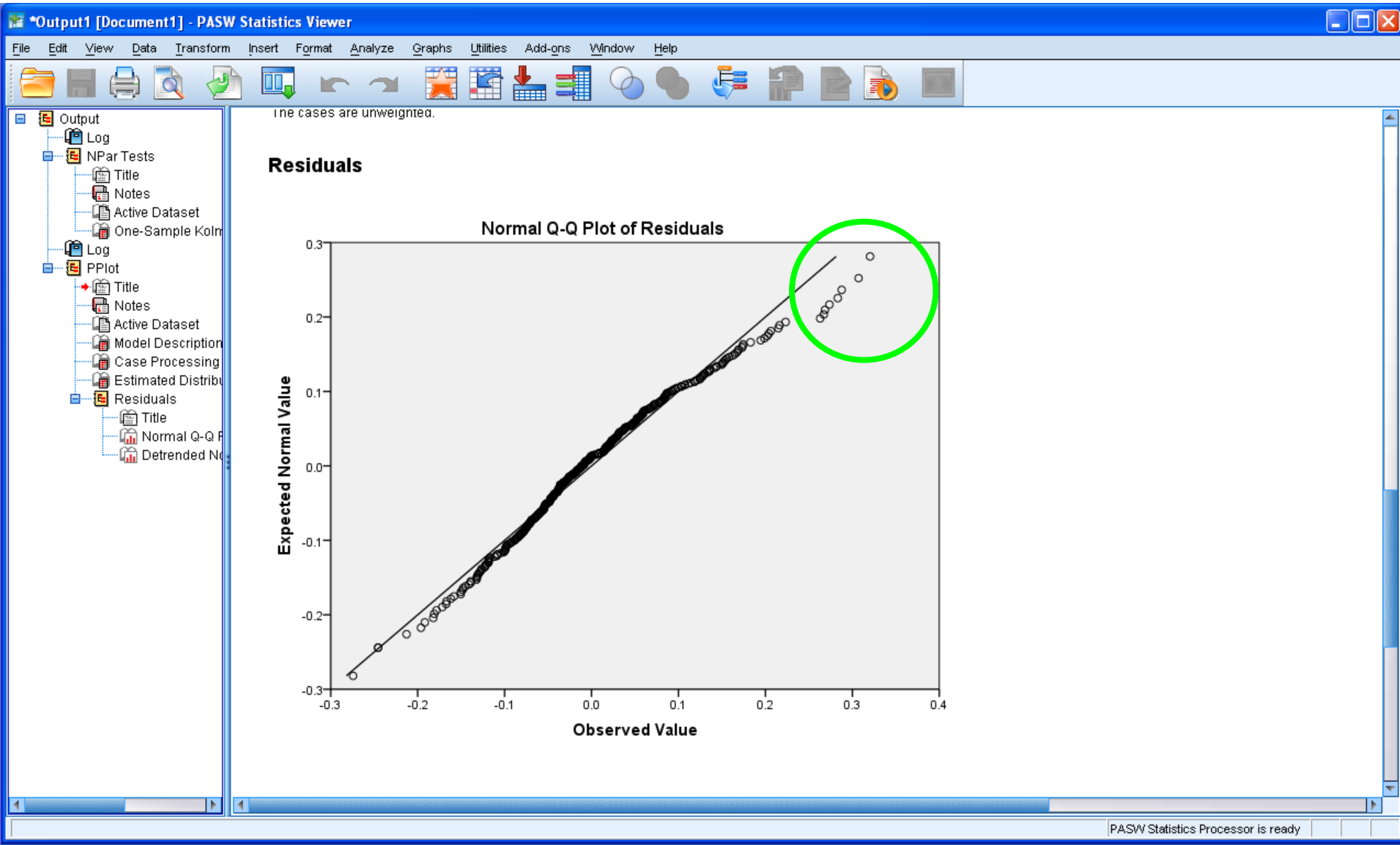
One-Sample Kolmogorov-Smirnov Test

		Residuals
N		417
Normal Parameters ^{a,b}	Mean	-.000350
	Std. Deviation	.0948805
Most Extreme Differences	Absolute	.058
	Positive	.058
	Negative	-.034
Kolmogorov-Smirnov Z		.189
Asymp. Sig. (2-tailed)		.119

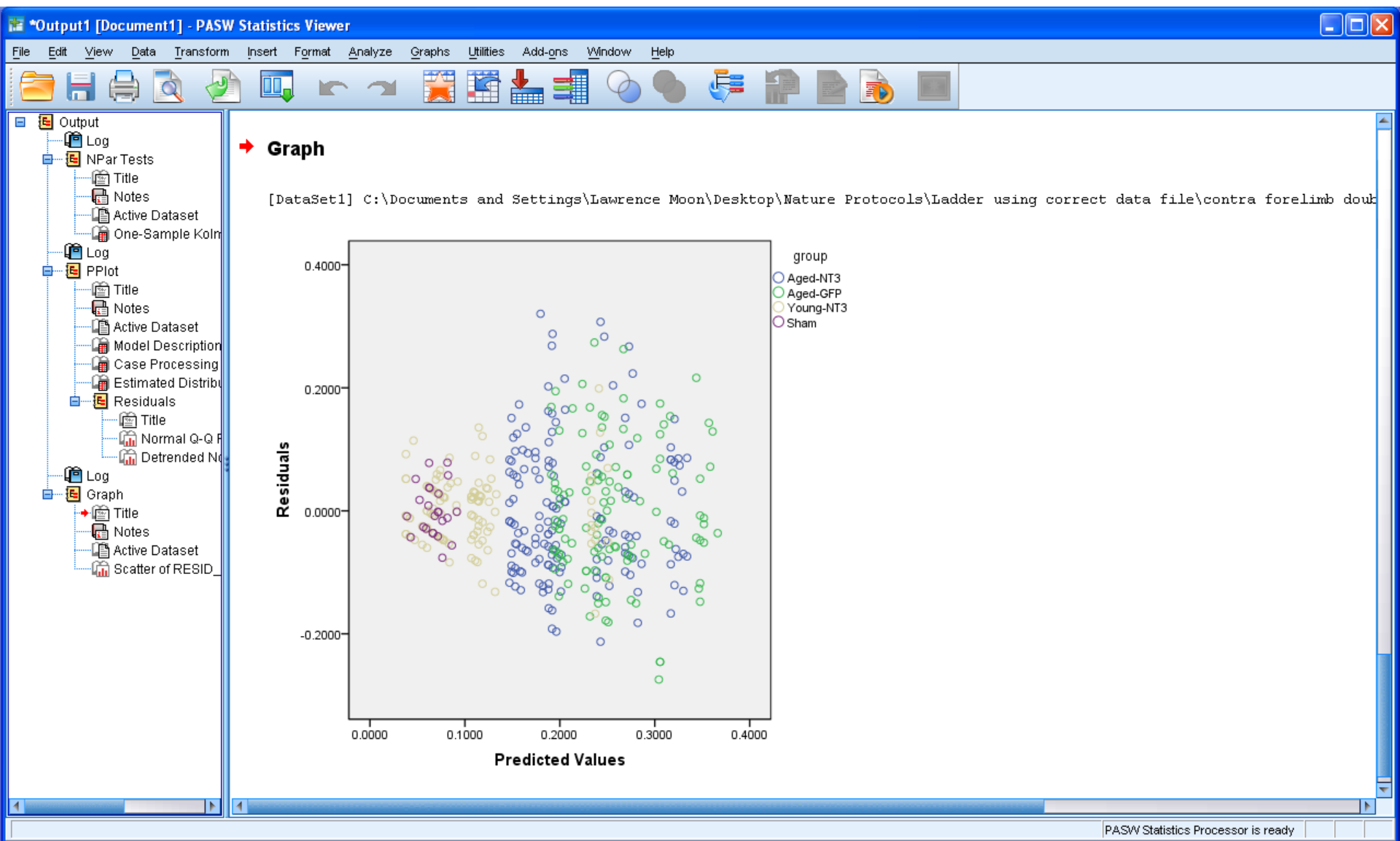
a. Test distribution is Normal.
b. Calculated from data.

The value .119 in the 'Asymp. Sig. (2-tailed)' row is circled in green.

Supplementary Tutorial, Slide 66: The vast majority of circles fall on the diagonal line, with only a few outliers (green circle). This Q-Q plot indicates the assumption of normality is reasonable.



Supplementary Tutorial, Slide 67: A scatterplot of the residuals against their predicted values shows no obvious correlation within groups. However, the variability of the residuals is smaller for the sham and young groups than for the two aged groups.



Supplementary Tutorial, Slide 68: Making the model more parsimonious

File Edit View Data Transform Analyze Graphs Utilities Add-ons Window Help

1: Improvement .79754546430483 Visible: 8 of 8 Variables

	rat	Adult_vs_Aged	injury	group	mean_preop	wave	outcome	Improvement	var	var	var	var	var	var
1	1	Adult	Stroke	Young-NT3	.0	1	.18	.80						
2	1	Adult	Stroke											
3	1	Adult	Stroke											
4	1	Adult	Stroke											
5	1	Adult	Stroke											
6	1	Adult	Stroke											
7	1	Adult	Stroke											
8	1	Adult	Stroke											
9	2	Adult	Sham											
10	2	Adult	Sham											
11	2	Adult	Sham											
12	2	Adult	Sham											
13	2	Adult	Sham											
14	2	Adult	Sham											
15	2	Adult	Sham											
16	2	Adult	Sham											
17	3	Adult	Sham											
18	3	Adult	Sham											
19	3	Adult	Sham											
20	3	Adult	Sham											
21	3	Adult	Sham											
22	3	Adult	Sham	Sham	.06	6	.0	.80						
23	3	Adult	Sham	Sham	.06	7	.03	.80						
24	3	Adult	Sham	Sham	.06	8	.0	.80						
25	4	Adult	Stroke	Young-NT3	.0	1	.25	.80						

Linear Mixed Models: Fixed Effects

Fixed Effects

Build terms Build nested terms

Factors and Covariates:

- wave
- group
- mean_preop

Model:

- wave
- group
- wave*group
- mean_preop

Factorial

By* (Within) Clear Term Add Remove

Build Term:

include intercept Sum of squares: Type III

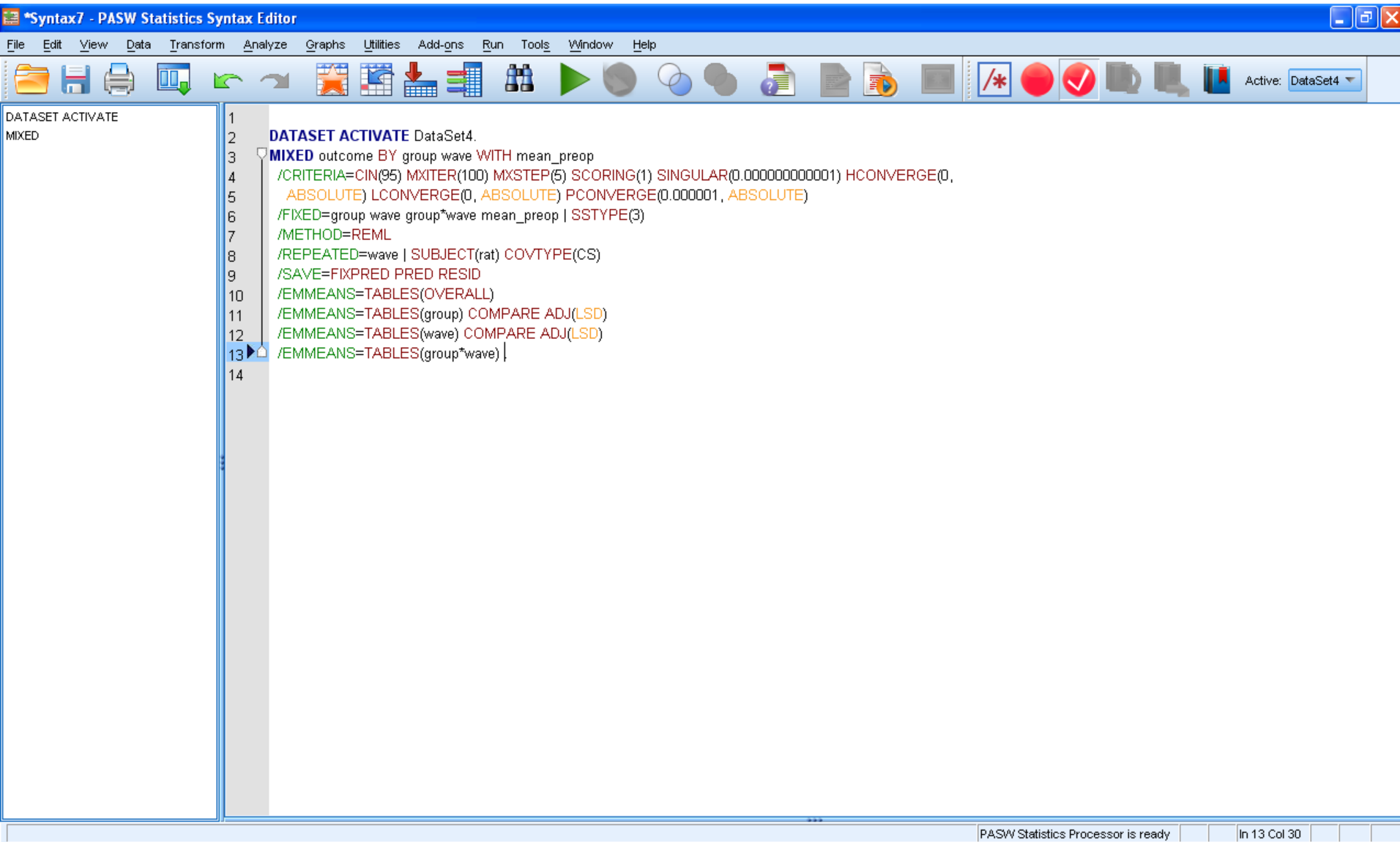
Continue Cancel Help

Data View Variable View

PASW Statistics Processor is ready

start 3 Mic... Windo... 2 Wi... Duricki... 2 Fir... EndNo... 3 PA... 2 Mic... 3 Ad... 09:26

Supplementary Tutorial, Slide 69: Analysis using CS covariance structure with estimation performed using REML



The screenshot displays the PASW Statistics Syntax Editor interface. The main window contains the following syntax code:

```
1 DATASET ACTIVATE DataSet4.  
2  
3 MIXED outcome BY group wave WITH mean_preop  
4 /CRITERIA=CIN(95) MXITER(100) MXSTEP(5) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0,  
5 ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)  
6 /FIXED=group wave group*wave mean_preop | SSTYPE(3)  
7 /METHOD=REML  
8 /REPEATED=wave | SUBJECT(rat) COVTYPE(CS)  
9 /SAVE=FIXPRED PRED RESID  
10 /EMMEANS=TABLES(OVERALL)  
11 /EMMEANS=TABLES(group) COMPARE ADJ(LSD)  
12 /EMMEANS=TABLES(wave) COMPARE ADJ(LSD)  
13 /EMMEANS=TABLES(group*wave) |  
14
```

The interface includes a menu bar (File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Run, Tools, Window, Help), a toolbar with various icons, and a status bar at the bottom indicating "PASW Statistics Processor is ready" and "In 13 Col 30".

Supplementary Tutorial, Slide 70:

The screenshot displays the PASW Statistics Syntax Editor interface. The title bar reads '*Syntax7 - PASW Statistics Syntax Editor'. The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Add-ons, Run, Tools, Window, and Help. The toolbar contains various icons for file operations, analysis, and execution. The main window shows a syntax script for a mixed-effects model. The left pane shows the 'DATASET ACTIVATE' and 'MIXED' commands. The script is as follows:

```
1 DATASET ACTIVATE DataSet4.  
2  
3 MIXED outcome BY group wave WITH mean_preop  
4 /CRITERIA=CIN(95) MXITER(100) MXSTEP(5) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0,  
5 ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)  
6 /FIXED=group wave group*wave mean_preop | SSTYPE(3)  
7 /METHOD=REML  
8 /REPEATED=wave | SUBJECT(rat) COVTYPE(CS)  
9 /SAVE=FIXPRED PRED RESID  
10 /EMMEANS=TABLES(OVERALL)  
11 /EMMEANS=TABLES(group) COMPARE ADJ(LSD)  
12 /EMMEANS=TABLES(wave) COMPARE ADJ(LSD)  
13 /EMMEANS=TABLES(group*wave)  
14 /EMMEANS=TABLES(group*wave) COMPARE(group) ADJ(LSD)  
15 /EMMEANS=TABLES(group*wave) COMPARE(wave) ADJ(LSD).  
16
```

The status bar at the bottom indicates 'PASW Statistics Processor is ready' and 'In 16 Col 0'. The Windows taskbar at the very bottom shows the Start button and several open applications including Microsoft Word, Windows Explorer, and the PASW Statistics Processor.

Supplementary Tutorial, Slide 71:

***Output10 [Document10] - PASW Statistics Viewer**

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Log
Mixed Model Analysis
Title
Notes
Active Dataset
Model Dimension
Information Criteria
Fixed Effects
Title
Type III Test Statistics
Covariance Parameters
Title
Estimates
Estimated Marginal Means
Title
1. Grand Mean
2. group
Title
Estimate
Pairwise Comparison
Univariate
3. wave
Title
Estimate
Pairwise Comparison
Univariate
4. group * wave
5. group * wave
Title
Estimate
Pairwise Comparison
Univariate
6. group * wave
Title
Estimate
Pairwise Comparison
Univariate

Mixed Model Analysis

[DataSet4] C:\Documents and Settings\Lawrence Moon\Desktop\NATURE PROTOCOLS FOR TRIP\SPSS files\long_format.sav

Model Dimension^a

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables	Number of Subjects
Fixed Effects	Intercept	1		1		
	group	4		3		
	wave	8		7		
	group * wave	32		21		
	mean_preop	1		1		
Repeated Effects	wave	8	Compound Symmetry	2	rat	53
Total		54		35		

a. Dependent Variable: outcome.

Information Criteria^a

-2 Restricted Log Likelihood	-655.038
Akaike's Information Criterion (AIC)	-651.038
Hurwich and Tsai's Criterion (AICC)	-651.007
Bozdogan's Criterion (CAIC)	-641.137
Schwarz's Bayesian Criterion (BIC)	-643.137

The information criteria are displayed in smaller-is-better forms.
a. Dependent Variable: outcome.

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 72:

***Output10 [Document10] - PASW Statistics Viewer**

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Log
Mixed Model Analysis
Title
Notes
Active Dataset
Model Dimensionality
Information Criteria
Fixed Effects
Title
Type III Tests
Covariance Parameters
Title
Estimates
Estimated Marginal Means
Title
1. Grand Mean
2. group
Title
Estimate
Pairwise
Univariate
3. wave
Title
Estimate
Pairwise
Univariate
4. group * wave
5. group * wave
Title
Estimate
Pairwise
Univariate
6. group * wave
Title
Estimate
Pairwise
Univariate

Fixed Effects

Type III Tests of Fixed Effects^a

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	47.908	131.126	.000
group	3	48.011	23.637	.000
wave	7	336.463	6.797	.000
group * wave	21	336.633	1.600	.047
mean_preop	1	48.599	.607	.440

a. Dependent Variable: outcome.

Covariance Parameters

Estimates of Covariance Parameters^a

Parameter	Estimate	Std. Error
Repeated Measures CS diagonal offset	.007501	.000579
CS covariance	.002281	.000664

a. Dependent Variable: outcome.

Estimated Marginal Means

1. Grand Mean^b

Mean	Std. Error	df	95% Confidence Interval	
			Lower Bound	Upper Bound
.161 ^a	.010	47.822	.140	.182

a. Covariates appearing in the model are evaluated at the following values: mean_preop = .0485

PASW Statistics Processor is ready

start 3 Micr... Windo... 2 Win... Durick... 2 Fire... EndNot... 3 PAS... 2 Micr... 3 Ado... 11:54

Supplementary Tutorial, Slide 73:

***Output10 [Document10] - PASW Statistics Viewer**

File Edit View Data Transform Insert Format Analyze Graphs Utilities Add-ons Window Help

Log
Mixed Model Analysis
Title
Notes
Active Dataset
Model Dimensionality
Information Criteria
Fixed Effects
Title
Type III Tests
Covariance Parameters
Title
Estimates
Estimated Marginal Means
Title
1. Grand Mean
2. group
Title
Estimates
Pairwise Comparisons
Univariate
3. wave
Title
Estimates
Pairwise Comparisons
Univariate
4. group * wave
Title
Estimates
Pairwise Comparisons
Univariate
5. group * wave * age
Title
Estimates
Pairwise Comparisons
Univariate
6. group * wave * age * sex
Title
Estimates
Pairwise Comparisons
Univariate

Estimates^b

group	Mean	Std. Error	df	95% Confidence Interval	
				Lower Bound	Upper Bound
Aged-NT3	.215 ^a	.013	48.018	.190	.241
Aged-GFP	.257 ^a	.015	48.963	.227	.287
Young-NT3	.107 ^a	.015	47.624	.077	.136
Sham	.065 ^a	.033	47.623	-.001	.131

a. Covariates appearing in the model are evaluated at the following values:
mean_preop = .0485.

b. Dependent Variable: outcome.

Pairwise Comparisons^b

(I) group	(J) group	Mean Difference (I-J)	Std. Error	df	Sig. ^a	95% Confidence Interval for Difference ^a	
						Lower Bound	Upper Bound
Aged-NT3	Aged-GFP	-.042 [*]	.020	48.531	.039	-.081	-.002
	Young-NT3	.109 [*]	.019	47.798	.000	.070	.148
	Sham	.150 [*]	.035	47.671	.000	.079	.221
Aged-GFP	Aged-NT3	.042 [*]	.020	48.531	.039	.002	.081
	Young-NT3	.150 [*]	.021	48.230	.000	.108	.192
Young-NT3	Aged-NT3	-.109 [*]	.019	47.798	.000	-.148	-.070
	Aged-GFP	-.150 [*]	.021	48.230	.000	-.192	-.108
	Sham	.042	.036	47.628	.255	-.031	.114
Sham	Aged-NT3	-.150 [*]	.035	47.671	.000	-.221	-.079
	Aged-GFP	-.192 [*]	.036	47.889	.000	-.264	-.119
	Young-NT3	-.042	.036	47.628	.255	-.114	.031

Based on estimated marginal means

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 75: Restructuring data. First save the data file by File>Save As because the Restructuring overwrites your existing file. Next click Data>Restructure.

The screenshot shows the SPSS Data Editor window with the 'Data' menu open. The 'Restructure...' option is highlighted. The data table in the background contains the following information:

Case #	Group	mean_preop	mean_postop 1	mean_postop 2	mean_postop 3	mean_postop 4	mean_postop 5	mean_postop 6	mean_postop 7	mean_postop 8	var
1	Young-NT3	.0	.18	.16	.10	.07	.03	.06	.03	.03	
2	Sham	.10	.09	.07	.06	.07	.03	.16	.07	.10	
3	Sham	.06	.03	.06	.10	.03	.03	.0	.03	.0	
4	Young-NT3	.0	.25	.13	.13	.13	.03	.10	.03	.09	
5	Young-NT3	.0	.21	.09	.10	.14	.03	.10	.03	.09	
6	Young-NT3	.0	.20	.10	.13	.10	.03	.0	.13	.0	
7	Young-NT3	.0	.28	.25	.13	.07	.07	.06	.09	.13	
8	Young-NT3	.03	.21	.24	.03	.13	.10	.10	.10	.03	
9	Young-NT3	.07	.37	.09	.14	.07	.03	.12	.03	.0	
10	Young-NT3	.14	.14	.16	.14	.18	.13	.10	.14	.03	
11	Young-NT3	.0	.29	.06	.03	.14	.06	.03	.14	.0	
12	Young-NT3	.03	.07	.10	.14	.08	.10	.06	.03	.03	
13	Young-NT3	.13	.32	.13	.16	.21	.17	.03	.09	.0	
14	Young-NT3	.0	.23	.13	.06	.13	.10	.03	.10	.03	
15	Sham	.03	.14	.10	.03	.07	.14	.07	.10	.03	
16	Young-NT3	.03	.19	.0	.20	.03	.13	.06	.03	.0	
17	Adult Stroke	.13	.20	.0	.06	.10	.0	.10	.10	.03	
18	Adult Stroke	.06	.44	.16	.14	.14	.07	.03	.12	.16	
19	Aged Stroke	.04	.26	.17	.19	.25	.20	.50	.13	.10	
20	Aged Stroke	.13	.42	.46	.46	.37	.42	.46	.30	.26	
21	Aged Stroke	.10	.26	.10	.22	.11	.18	.10	.06	.13	
22	Aged Stroke	.10	.20	.15	.13	.13	.07	.17	.10	.23	
23	Aged Stroke	.03	.20	.33	.30	.29	.14	.10	.13	.39	
24	Aged Stroke	.03	.20	.38	.03	.13	.0	.10	.21	.03	

Supplementary Tutorial, Slide 78: Restructuring data

Restructure Data Wizard - Step 3 of 7

Variables to Cases: Select Variables

For each variable group you have in the current data the restructured file will have one target variable.

In this step, choose how to identify case groups in the restructured data, and choose which variables belong with each target variable.

Optionally, you can also choose variables to copy to the new file as Fixed Variables.

Variables in the Current File:

- rat
- Adult_vs_Aged
- injury
- group
- mean_preop
- mean_postop1
- mean_postop2
- mean_postop3
- mean_postop4
- mean_postop5
- mean_postop6
- mean_postop7
- mean_postop8

Case_Group Identification:

Use selected variable

Variable: rat

Variables to be Transposed:

Target Variable: outcome

- mean_postop1
- mean_postop2
- mean_postop3
- mean_postop4

Fixed Variable(s):

- Adult_vs_Aged
- injury
- group

< Back Next > Finish Cancel Help

Supplementary Tutorial, Slide 79: In this case, you only have One index variable. See next slide for an explanation of the indexing variable.

Restructure Data Wizard - Step 4 of 7

Variables to Cases: Create Index Variables

In the current data, values for a variable group appear in a single case in multiple variables. For example, a single case contains the values for w1, w2, and w3.

In the new data, values for a variable group will appear in multiple cases in a single variable. For example, there will be three cases, one each for w1, w2, and w3.

An index is a new variable that identifies the group of new cases that was created from the original case. For example, an index named "w" would have the values 1, 2, and 3.

How many index variables do you want to create?

One
Use this when a variable group records the effects of a single factor, treatment or condition.

More than one How many?
Use this when a variable group records the effects of more than one factor, treatment or condition.

None
Use this if index information is stored in one of the sets of variables to be transposed.

< Back Next > Finish Cancel Help

Name	Type	Width	Measure	Role
1	rat	Numeric	8	Input
2	Adult_vs_Aged	Numeric	8	Input
3	injury	Numeric	8	Input
4	group	Numeric	8	Input
5	mean_preop	Numeric	8	Input
6	mean_postop1	Numeric	8	Input
7	mean_postop2	Numeric	8	Input
8	mean_postop3	Numeric	8	Input
9	mean_postop4	Numeric	8	Input
10	mean_postop5	Numeric	8	Input
11	mean_postop6	Numeric	8	Input
12	mean_postop7	Numeric	8	Input
13	mean_postop8	Numeric	8	Input

Supplementary Tutorial, Slide 80: Type “wave” into the “Name” for your first indexing variable. This generates a new variable called “wave” with eight levels corresponding to your Repeated Measure time points.

Restructure Data Wizard - Step 5 of 7

Variables to Cases: Create One Index Variable

You have chosen to create one index variable. The variable's values can be sequential numbers or the names of variables in a group.

In the table you can specify the name and label for the index variable.

What kind of index values?

Sequential numbers
Index Values: 1, 2, 3, 4, 5, 6, 7, 8

Variable names
Index Values: mean_postop1, mean_postop2, mean_postop3, mean_postop4, mean_postop5, mean_postop6, mean_postop7, mean_postop8

Edit the Index Variable Name and Label:

	Name	Label	Levels	Index Values
1	wave		8	1, 2, 3, 4, 5, 6, 7, 8

< Back Next > Finish Cancel Help

Supplementary Tutorial, Slide 81: Click Next, Next, Finish, OK.

Restructure Data Wizard - Finish

Finish

What do you want to do?

- Restructure the data now
Use this when you want to replace the current file immediately.
- Paste the syntax generated by the wizard into a syntax window
Use this when you want to save or modify the syntax before you restructure the data.

< Back Next > Finish Cancel Help

	Name	Type	Width	Measure	Role
1	rat	Numeric	8		Input
2	Adult_vs_Aged	Numeric	8		Input
3	injury	Numeric	8		Input
4	group	Numeric	8		Input
5	mean_preop	Numeric	8		Input
6	mean_postop1	Numeric	8		Input
7	mean_postop2	Numeric	8		Input
8	mean_postop3	Numeric	8		Input
9	mean_postop4	Numeric	8		Input
10	mean_postop5	Numeric	8		Input
11	mean_postop6	Numeric	8		Input
12	mean_postop7	Numeric	8		Input
13	mean_postop8	Numeric	8		Input
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

Restructure...

PASW Statistics Processor is ready

Supplementary Tutorial, Slide 82: Annoyingly, SPSS does not carry forward the “missing value” designation. To fix this, click “Variable View” and the blue “...” icon in “Missing” for “outcome”. Click on “Discrete missing values” and enter “999.00” in one box.

The screenshot shows the SPSS Variable View window. The 'Missing' column for the 'outcome' variable is highlighted in yellow. A 'Missing Values' dialog box is open, showing the 'Discrete missing values' option selected. The first input field contains '999.00'. The 'Data View' and 'Variable View' tabs are visible at the bottom, with 'Variable View' selected.

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	rat	Numeric	8	0		None	None	8	Right	Nominal	Input
2	Adult_vs_Aged	Numeric	8	2		{1.00, Adult}...	None	8	Right	Nominal	Input
3	injury	Numeric	8	0		{1, Sham}...	None	8	Right	Nominal	Input
4	group	Numeric	8	2		{1.00, p}...	None	8	Right	Nominal	Input
5	wave	Numeric	4	0		None	None	8	Right	Nominal	Input
6	outcome	Numeric	8	2		None	None	8	Right	Scale	Input

Missing Values

No missing values

Discrete missing values

999.00

Range plus one optional discrete missing value

Low: High:

Discrete value:

OK Cancel Help

Supplementary Tutorial, Slide 83: Users of SPSS version 19 or later can use the GENLINUX procedure to fit linear models with general error covariance structures and different variance components for different groups of subjects.

Entire books have been written about the GENLINUX procedure, so a full explanation is beyond the scope of this article.

However, the following Syntax may be used as guidance to begin fitting a model which would allow males and females to have different error variance components for a Scale (i.e., quantitative, continuous) dependent variable called “weight”, an independent variable called “iv1” and a repeated measure called “time”.

```
GENLINUX
/ATA_STRUCTURE SUBJECTS=subject REPEATED_MEASURES=time GROUPING=male COVARIANCE_TYPE=IDENTITY
/FIELDS TARGET=weight TRIALS=NONE OFFSET=NONE
/TARGET_OPTIONS DISTRIBUTION=NORMAL LINK=IDENTITY
/FIXED EFFECTS=time male iv1 USE_INTERCEPT=TRUE
...
```

Specify whatever BUILD_OPTIONS and EMMEANS_OPTIONS you want. The output format needs to be changed from “Diagram” to “Table”.

We thank an anonymous reviewer for providing this suggestion.