

Block 3: Analysing two variables (and sometimes three)

Multiple response

3.3.2a [SPSS 15] First exercise in multiple response

[1990, Updated 20 July 2011]

For a general discussion of multiple response questions (ie "Tick as many as apply") and how to analyse them with SPSS, see [3.3.1 Multiple response and SPSS: an introduction](#).

[NB: I'm working on a new version of this tutorial for SPSS 19]

Exemplar: Pre-course questionnaire on interests and experience

Task 1: Produce a **grouped frequency table** for the multiple responses to Q.4 (previous experience of keyboard, statistics, computing etc) of the [Questionnaire](#) on pre-course interests and experience.

Task 2: **Tabulate** these by sex, first for a simple count, second to include appropriate percentages.

Q4. Have you had training or practical experience in any of the following? (Tick as many as apply)		(16-20)
Typing	<input type="checkbox"/>	1
Wordprocessing	<input type="checkbox"/>	2
Social Statistics	<input type="checkbox"/>	3
Survey analysis using SPSS or similar packages	<input type="checkbox"/>	4
Other computing experience (Please specify)	<input type="checkbox"/>	5

[Extract from questionnaire]

The cumulative raw data (from questionnaires completed by six successive waves of students) are contained in file [myclass.txt](#) on this site. There is a single record for each case and the codes for Q4 are entered as numeric integers in columns 16 to 20. It doesn't matter how many codes (up to a maximum of five) are entered in these five columns or in which order. Although the codes on the questionnaire are in the range 1 to 5, there are some cases with a code 6 in column 16 (as in the data extract below). This code was added later to indicate "None of the above" (i.e. no boxes ticked).

[Extract from raw data]

36	23514	222	5	12	1	2	38	5	10
37	12435	232	5	12345	2	1	35	5	5
38	15324	223	3	1235	1	1	69	6	0
39	12543	223	4	6	2	1	31	1.65	
40	13524	233	4	123	2	1	24	5	9
41	34215	224	5	25	1	1	38	6	1
42	14253	213		125	2	3	37	5	4
43	25431	323	2	12345	1	2	30	6	0
44	35421	213	2	1235	2	1	40	5	1
45	24315	122	3	3	1	1	31	5	10

The data were entered into SPSS using the **positional** convention for variable names (see: [1.3.1 Conventions for Naming Variables in SPSS](#)) in this case **V16 TO V20**, and are stored with full dictionary information in the SPSS saved file [myclass3.sav](#) on this site.

One way of analysing these questions is to produce frequency counts for each one and then add them together by hand.

freq v16 to v20 .

v16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Typing	105	62.1	70.0	70.0
	Word- process	19	11.2	12.7	82.7
	Social statistics	11	6.5	7.3	90.0
	Other	6	3.6	4.0	94.0
	6	9	5.3	6.0	100.0
	Total	150	88.8	100.0	
Missing	System	19	11.2		
Total		169	100.0		

v17

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.6	.8	.8
	2	109	64.5	85.2	85.9
	3	4	2.4	3.1	89.1
	4	7	4.1	5.5	94.5
	5	7	4.1	5.5	100.0
	Total	128	75.7	100.0	
Missing	System	41	24.3		
Total		169	100.0		

v18

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	2	1.2	2.8	2.8
	3	46	27.2	64.8	67.6
	4	2	1.2	2.8	70.4
	5	21	12.4	29.6	100.0
	Total	71	42.0	100.0	
Missing	System	98	58.0		
Total		169	100.0		

v19

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	19	11.2	76.0	76.0
	5	6	3.6	24.0	100.0
	Total	25	14.8	100.0	
Missing	System	144	85.2		
Total		169	100.0		

v20

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	37	21.9	100.0	100.0
Missing	System	132	78.1		
Total		169	100.0		

You can also get a summary table like the one below (see **Appendix** on p.18 for how to do this) :

	Q4: (col 16)	Q4: (col 17)	Q4: (col 18)	Q4: (col 19)	Q4: (col 20)
	Count	Count	Count	Count	Count
1	105	1			
2	19	109	2		
3	11	4	46		
4		7	2	19	
5	6	7	21	6	37
6	11				

Adding these tables together by hand could be tedious and error prone, but SPSS has a special procedure to handle this kind of data.

The SPSS command **MULT RESPONSE** effectively makes up five separate tables (one for each variable V16 to V20) and then adds them all up into a single table. To do this it creates a temporary **group variable** which **cannot be saved**, but has to be re-created each time you want to use it in an SPSS run. It can only work in "integer mode" and so the values of any variables to be included in the groups have to be in numeric integer format (ie whole numbers with no decimal places).

The general format of the multiple response "group" specification is:

```
MULT RESPONSE GROUPS =
  <group variable1> [ ' <label> ' ]
    ( <source variable list1> ( <min> , <max> ) )
  /<group variable2> [ ' <label> ' ]
    ( <source variable list2> ( <min> , <max> ) )
```

in which items in **<chevrons>** are user supplied, items in **[square brackets]** are optional and items in **bold** (commands, keywords, brackets, slashes and primes) are compulsory.

Thus to specify a group variable for previous training or experience :

```
mult response groups =
  Q4 'Previous experience and skills'
  (v16 to v20 (1,6))
```

[NB: Don't forget the double brackets: leaving a bracket off is a common source of error]

If any ordinary variables are to be used for tables, they need to be declared with a range of values indicated by a pair of values separated by commas.

```
/ var sex (1,2)
```

The analyses available are frequency counts and contingency tables, but they need to be specified in a slightly different way as **sub-commands** in the specification field.

For the frequency table in this exercise the general format of the sub-command is:

/ FREQUENCIES = <group variable>

eg **/ freq q4 .**

.. and for contingency tables:

/ TABLES = <group variable> BY <varlist>

eg **/ tab q4 by sex .**

If you want percentages in the contingency tables they have to be requested using a **/ CELLS** sub-command just as in **CROSSTABS**. (Default base for percent is the number of valid cases.)

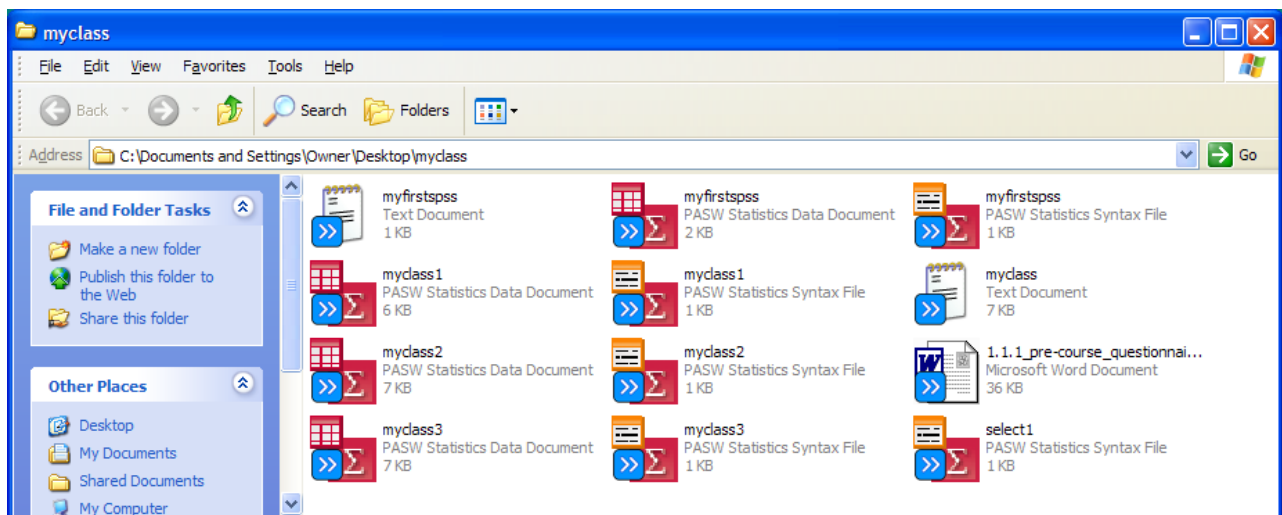
eg **/ tab q4 by sex
/ cel col .**

Note: The original variables for most multiple response sets will rarely be used as such, and do not normally need variable labels (unless you are using dichotomous mode). In **MULT RESPONSE** the group labels are entered (optionally) in the same way as variable labels, i.e. as labels in single primes. Value labels need be declared only for the first variable in the set.

Worked example

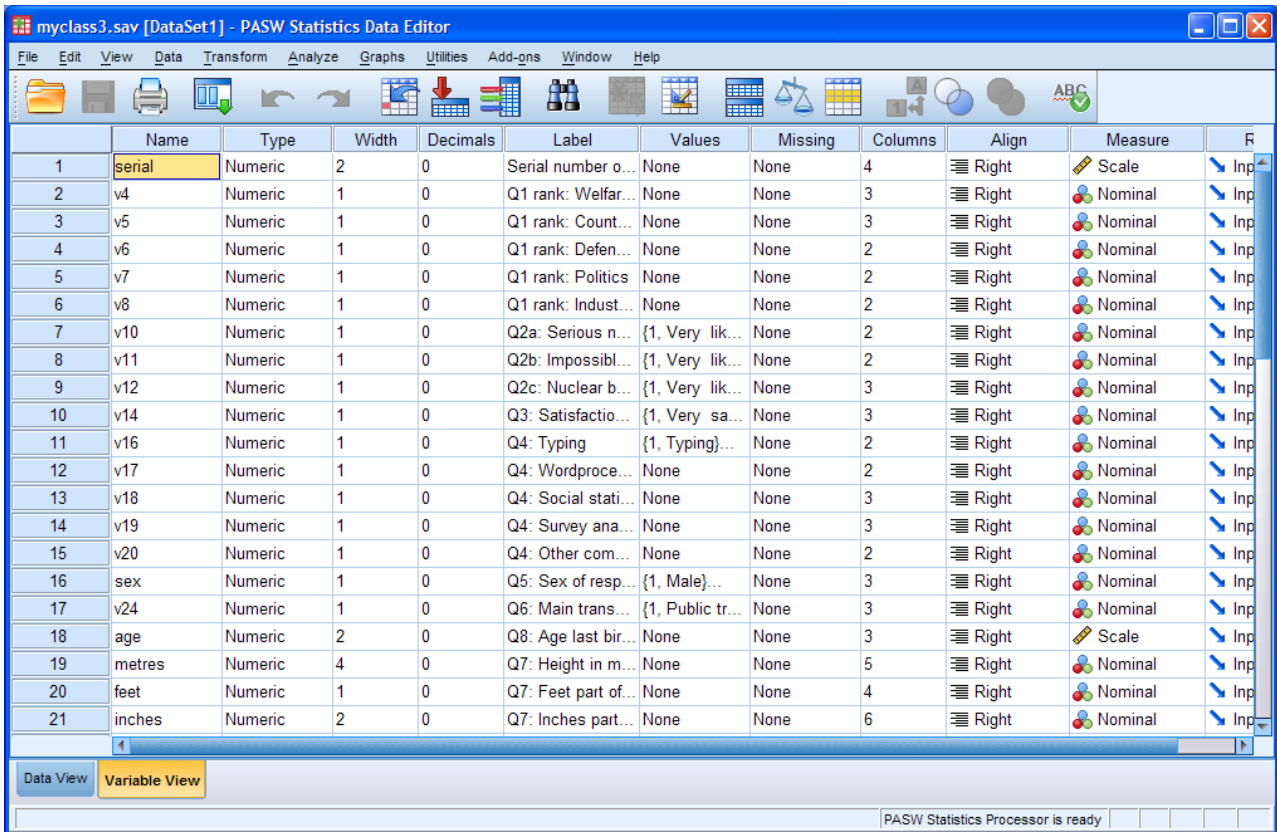
[NB: You'll need licenced access to SPSS if you want to do these exercises yourself, but you can still follow the logic and process by reading on]

If you've done the exercises in 1.3 1 and 3 1.4 you should have a folder **myclass** on your desktop with the SPSS saved file **myclass3.sav**.



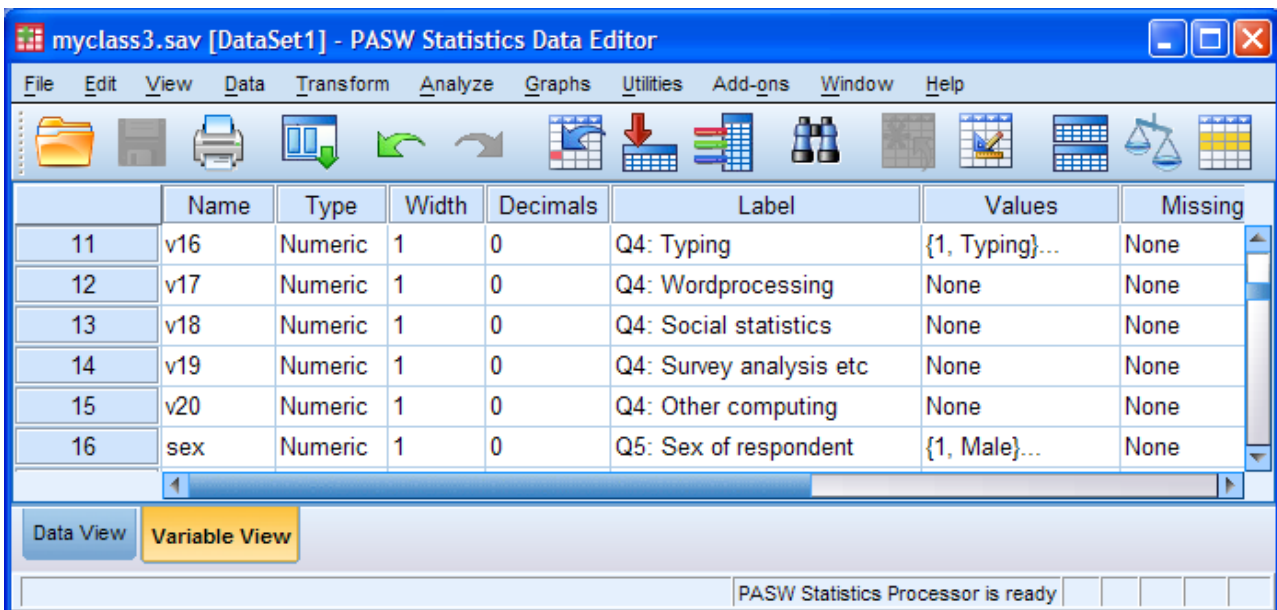
If you're coming directly into this tutorial, you'll need to download file [myclass3.sav](#) and save it to your own computer. SPSS will not open it directly from this site.

Step 1: Double click on **myclass3.sav**.



[NB: This is an early stage of the file, before certain levels of measurement are defined or changed from nominal to ordinal or scale.]

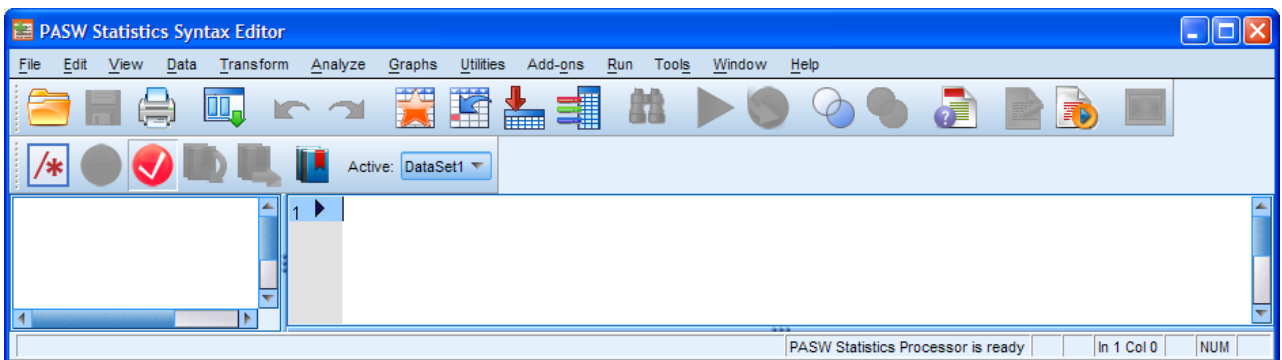
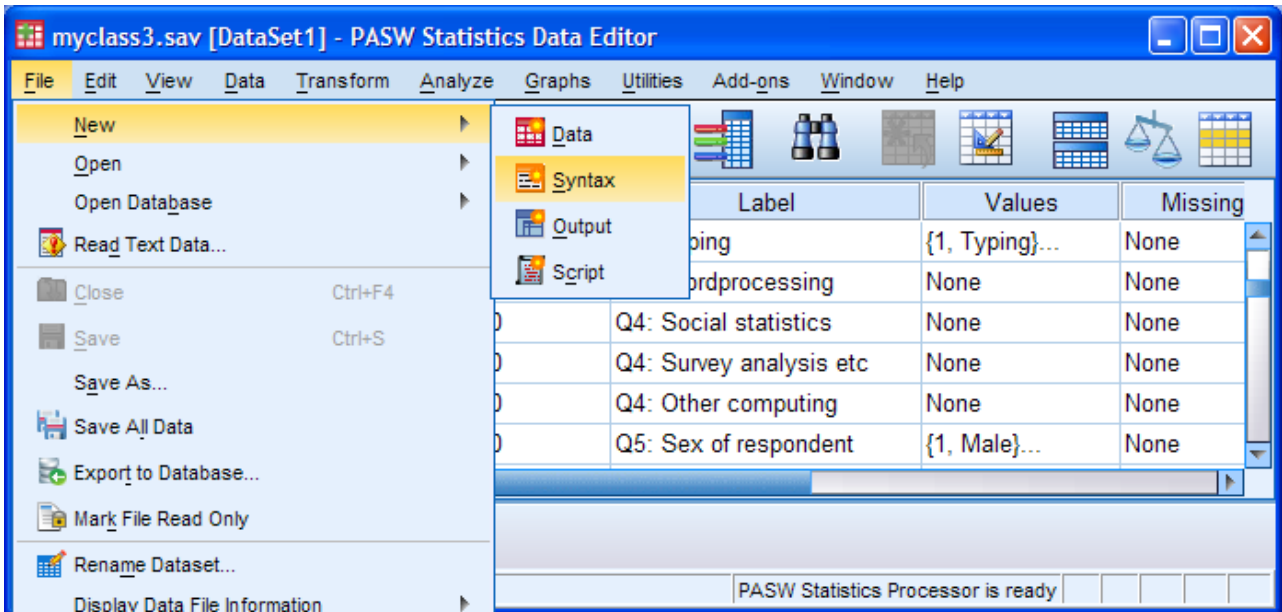
We're only interested in v16 to v20 and we can't see the labelling. We don't need all the columns either so adjust the display to your liking by reducing the height of the pane and adjusting the column widths to make it easier to see what you are doing.



[NB: By default, SPSS only reads the **value labels** from the first variable in the list, v16: there are no value labels for v17 to v20 as they'll only be used in multiple response tables]

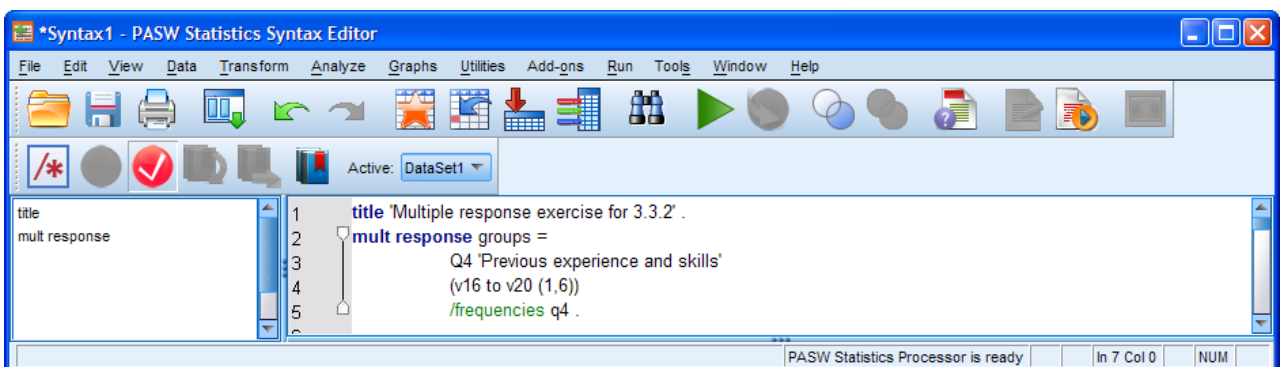
Step 2: Open a new syntax file

File... New ... Syntax



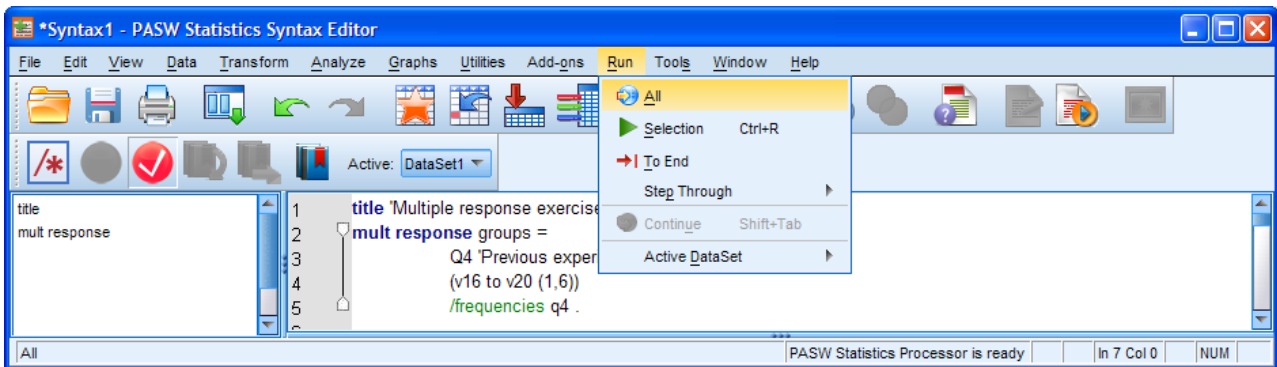
Give your job a title and type in the command for the grouped frequency table:

title 'Multiple response exercise for 3.3.2' .
mult response groups =
Q4 'Previous experience and skills'
(v16 to v20 (1,6))
/frequencies q4 .



[Don't forget the full stop!]

Run > All



.. to get:

Case Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Q4 ^a	167	98.8%	2	1.2%	169	100.0%

a. Group

Q4 Frequencies

	Responses	Percent of Cases	
		N	Percent
Q4 ^a Typing	106	25.8%	63.5%
Word- process	130	31.6%	77.8%
Social statistics	61	14.8%	36.5%
Survey analysis	28	6.8%	16.8%
Other	77	18.7%	46.1%
6	9	2.2%	5.4%
Total	411	100.0%	246.1%

a. Group

From this you can see that there are 169 cases in the file, of whom 2 have not answered the question and 9 (code 6) had no previous experience at all of any of the skills listed. The total number of boxes ticked is 402 (413 minus 11) The percentage of cases totals more than 100% because people ticked more than one box.

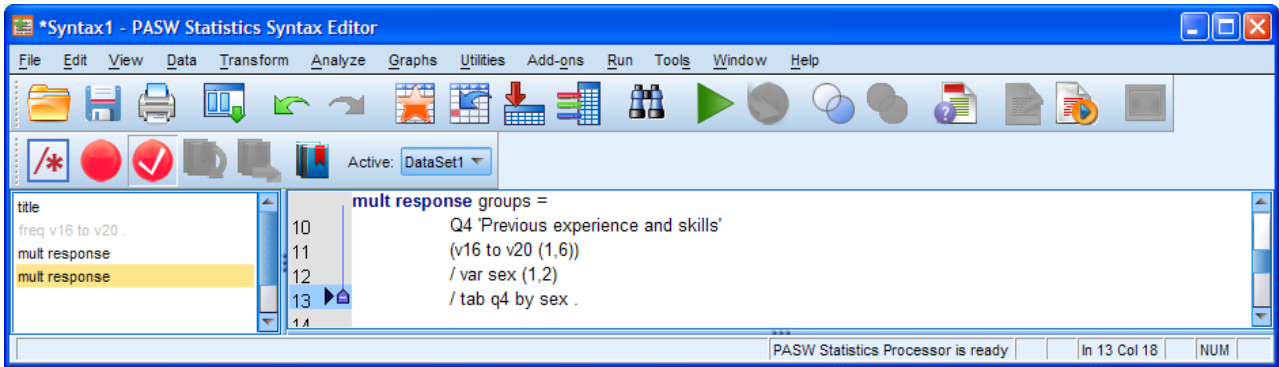
Step 3:

For the cross-tabulation by sex, go back to the syntax file, copy and paste the first three lines:

**mult response groups =
Q4 'Previous experience and skills'
(v16 to v20 (1,6))**

and add the following (use space or tab to inset):

**/ variables sex (1,2)
/ tables q4 by sex .**



[CTRL]R to run and produce...

Q4*sex Crosstabulation

			sex		Total
			Male	Female	
Q4 ^a	Typing	Count	26	80	106
	Word- process	Count	39	91	130
	Social statistics	Count	15	46	61
	Survey analysis	Count	10	18	28
	Other	Count	24	53	77
	6	Count	3	6	9
Total		Count	50	117	167

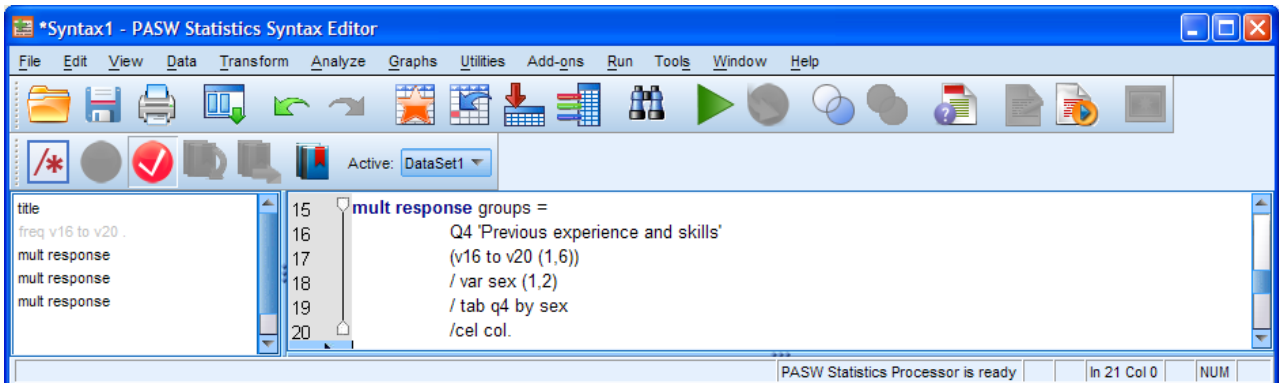
Percentages and totals are based on respondents.

a. Group

To add percentages to the table, go back to the syntax file, delete the full stop and add:

/cel col .

[Use space or tab to inset and **don't forget the full stop!**]



Run the job to produce:

			sex		Total
			Male	Female	
Q4 ^a	Typing	Count	26	80	106
		% within sex	52.0%	68.4%	
	Word- process	Count	39	91	130
		% within sex	78.0%	77.8%	
	Social statistics	Count	15	46	61
		% within sex	30.0%	39.3%	
	Survey analysis	Count	10	18	28
		% within sex	20.0%	15.4%	
	Other	Count	24	53	77
		% within sex	48.0%	45.3%	
6		Count	3	6	9
		% within sex	6.0%	5.1%	
Total	Count	50	117	167	

Percentages and totals are based on respondents.

a. Group

This table can be made easier to interpret by double clicking on the table in the SPSS output window to go into **pivot editing** mode:

The screenshot shows the PASW Statistics Viewer interface. The main window displays the 'Case Summary' and 'Q4*sex Crosstabulation' tables. The 'Q4*sex Crosstabulation' table is highlighted with a dashed border, indicating it is in pivot editing mode. A red arrow points to this table from the left-hand navigation pane. The status bar at the bottom indicates 'PASW Statistics Processor is ready' and 'H: 10.4, W: 12.01 cm'.

*Output1 [Document1] - PASW Statistics Viewer

File Edit View Insert **Pivot** Format Analyze Graphs Utilities Window Help

Reorder Categories
 Transpose Rows and Columns
 Pivoting Trays
 Go to Layers...

Case Summary

Cases						
Valid	Missing		Total			
Percent	N	Percent	N	Percent		
Q4*sex	167	98.8%	2	1.2%	169	100.0%

Q4*sex Crosstabulation

			sex		Total
			Male	Female	
Q4 ^a	Typing	Count	26	80	106
		% within sex	52.0%	68.4%	
Word- process	Count	39	91	130	
	% within sex	78.0%	77.8%		
Social statistics	Count	15	46	61	
	% within sex	30.0%	39.3%		
Survey analysis	Count	10	18	28	
	% within sex	20.0%	15.4%		
Other	Count	24	53	77	
	% within sex	48.0%	45.3%		
6	Count	3	6	9	
	% within sex	6.0%	5.1%		
Total		Count	50	117	167

Percentages and totals are based on respondents.

Pivoting Trays PASW Statistics Processor is ready H: 10.4, W: 12.01 cm

with a small pane displayed

Pivoting Trays

Pivot

LAYER

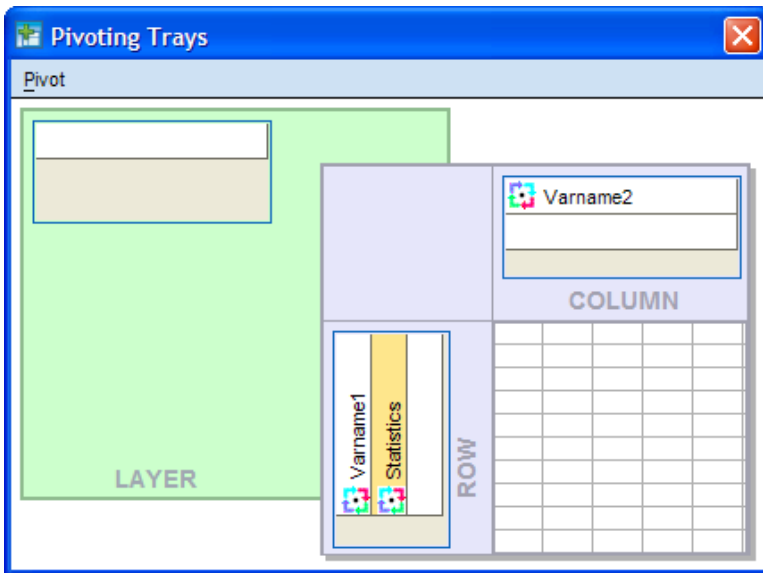
Varname1
 Statistics

ROW

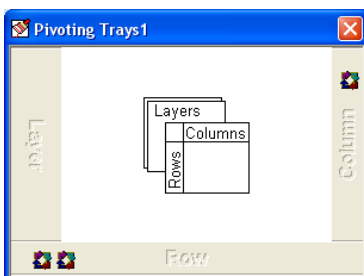
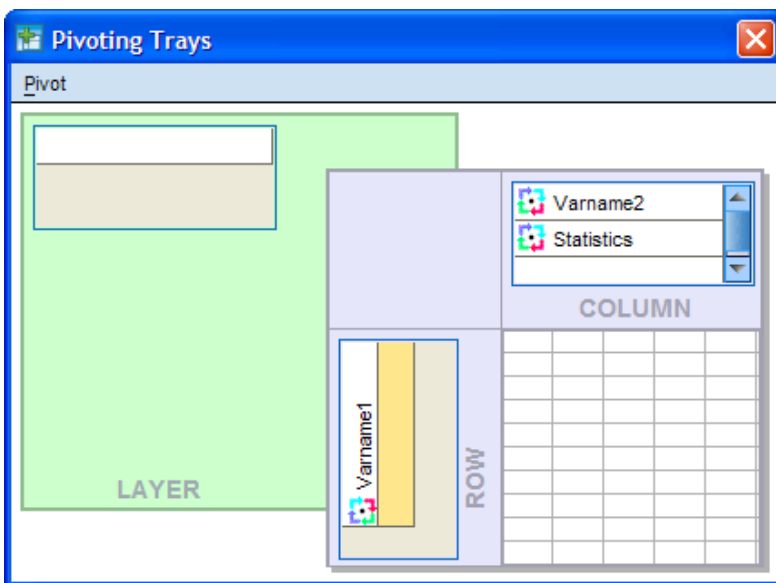
Varname2

COLUMN

Click on Statistics next to Varname1

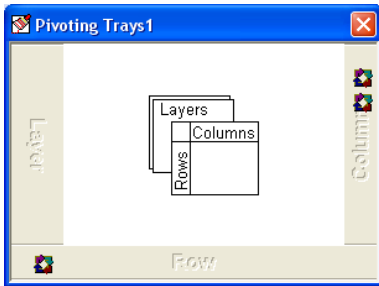


... and drag it to the empty box under Varname2

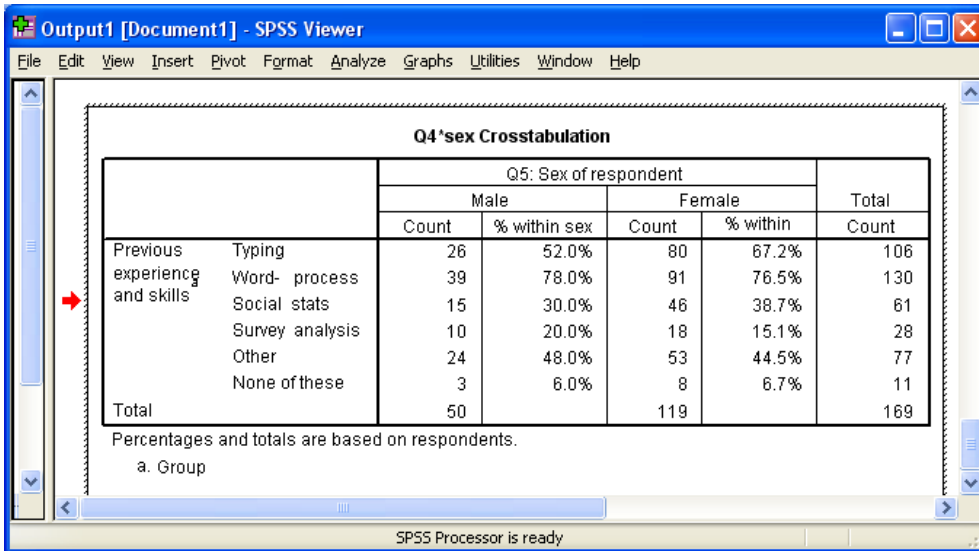


[In SPSS 15 it looks like this]

If you hover the mouse pointer over the small icon on the right in the **Row** bar at the bottom of the pane you will see it indicates **Statistics**. Hold the left mouse button down on the icon and drag it to the **Columns** bar at the right edge of the pane:



...and the table will change:



Closing the pivot editor leaves this table in the viewer:

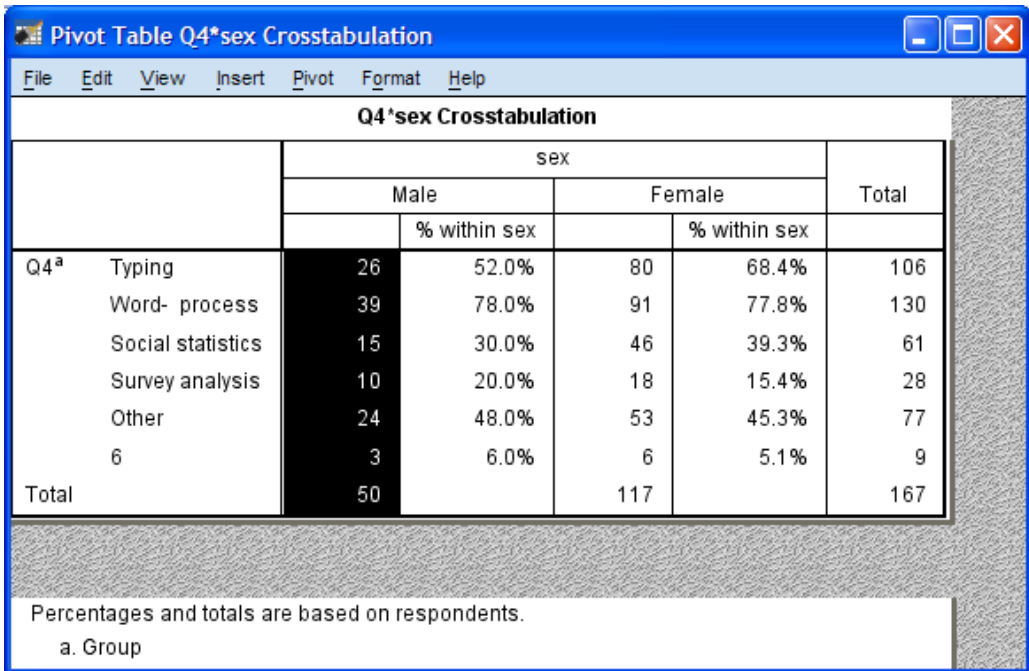
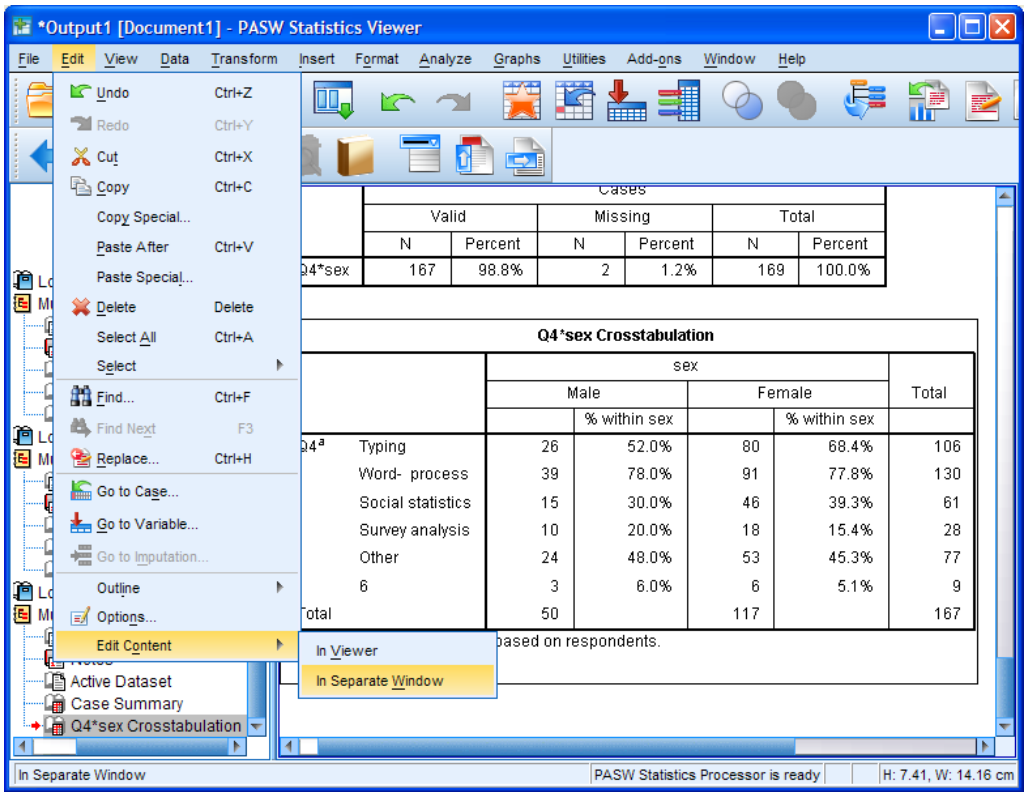
		sex				Total Count
		Male		Female		
		Count	% within sex	Count	% within sex	
Q4 ^a	Typing	26	52.0%	80	68.4%	106
	Word- process	39	78.0%	91	77.8%	130
	Social statistics	15	30.0%	46	39.3%	61
	Survey analysis	10	20.0%	18	15.4%	28
	Other	24	48.0%	53	45.3%	77
	6	3	6.0%	6	5.1%	9
Total		50		117		167

Percentages and totals are based on respondents.

a. Group

The pivot table can also be edited to delete the count columns and just leave the percentages, but this means you lose the base for percentaging within sex.

Edit > Edit Content > In Viewer [or In Separate Viewer]



You have to fiddle around a bit to get used to it, and possibly go out of pivot and back in to delete the other count column.

You can then slide the column markers to produce:

		sex		Total
		Male	Female	
		% within sex	% within sex	
Q4 ^a	Typing	52.0%	68.4%	106
	Word- process	78.0%	77.8%	130
	Social statistics	30.0%	39.3%	61
	Survey analysis	20.0%	15.4%	28
	Other	48.0%	45.3%	77
	6	6.0%	5.1%	9
Total				167

Percentages and totals are based on respondents.
a. Group

Closing the pivot editor leaves this table in the viewer:

		sex		Total
		Male	Female	
		% within sex	% within sex	
Q4 ^a	Typing	52.0%	68.4%	106
	Word- process	78.0%	77.8%	130
	Social statistics	30.0%	39.3%	61
	Survey analysis	20.0%	15.4%	28
	Other	48.0%	45.3%	77
	6	6.0%	5.1%	9
Total				167

Percentages and totals are based on respondents.
a. Group

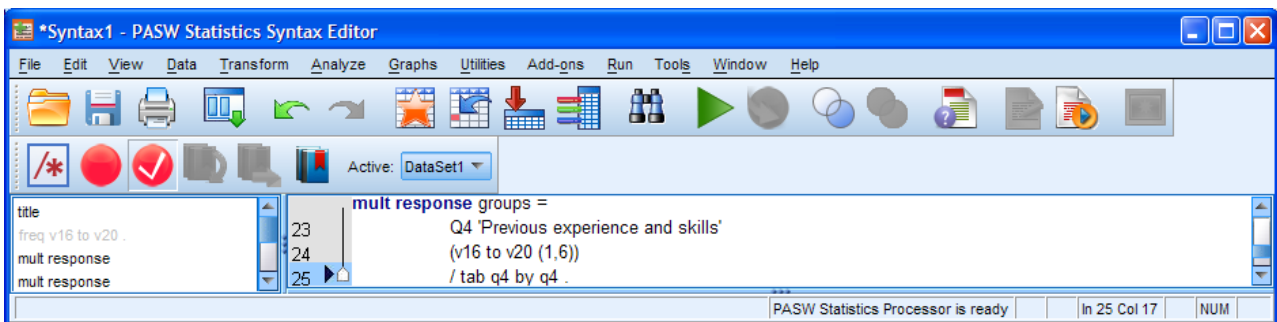
The table can be edited manually to move the headers around and manually add the **base for percentages**.

Q4*sex Crosstabulation

Previous experience and skills(a)	Q5: Sex of respondent	
	Male	Female
	% within sex	% within sex
Typing	52.0%	67.2%
Word- process	78.0%	76.5%
Social stats	30.0%	38.7%
Survey analysis	20.0%	15.1%
Other	48.0%	44.5%
None of these	6.0%	6.7%
(n = 100%)	(50)	(119)

Percentages and totals are based on respondents.
a Group

You can also tabulate mult response group variables with other group variables (there aren't any in this data set) or with themselves, as below,



but this only shows combinations of pairs of skills, not of three or more.

Q4*Q4 Crosstabulation

			Q4 ^a						Total
			Typing	Word- process	Social statistics	Survey analysis	Other	6	
Q4 ^a	Typing	Count	106	97	39	16	53	0	106
	Word- process	Count	97	132	46	25	64	0	130
	Social statistics	Count	39	46	61	20	26	0	61
	Survey analysis	Count	16	25	20	28	20	0	28
	Other	Count	53	64	26	20	77	0	77
	6	Count	0	0	0	0	0	9	9
Total	Count		106	130	61	28	77	9	167

Percentages and totals are based on respondents.

a. Group

[NB: When copied from the viewer, the table is too wide to fit the page. I had to reduce the font size and line-spacing, then slide all the column separators to get this]

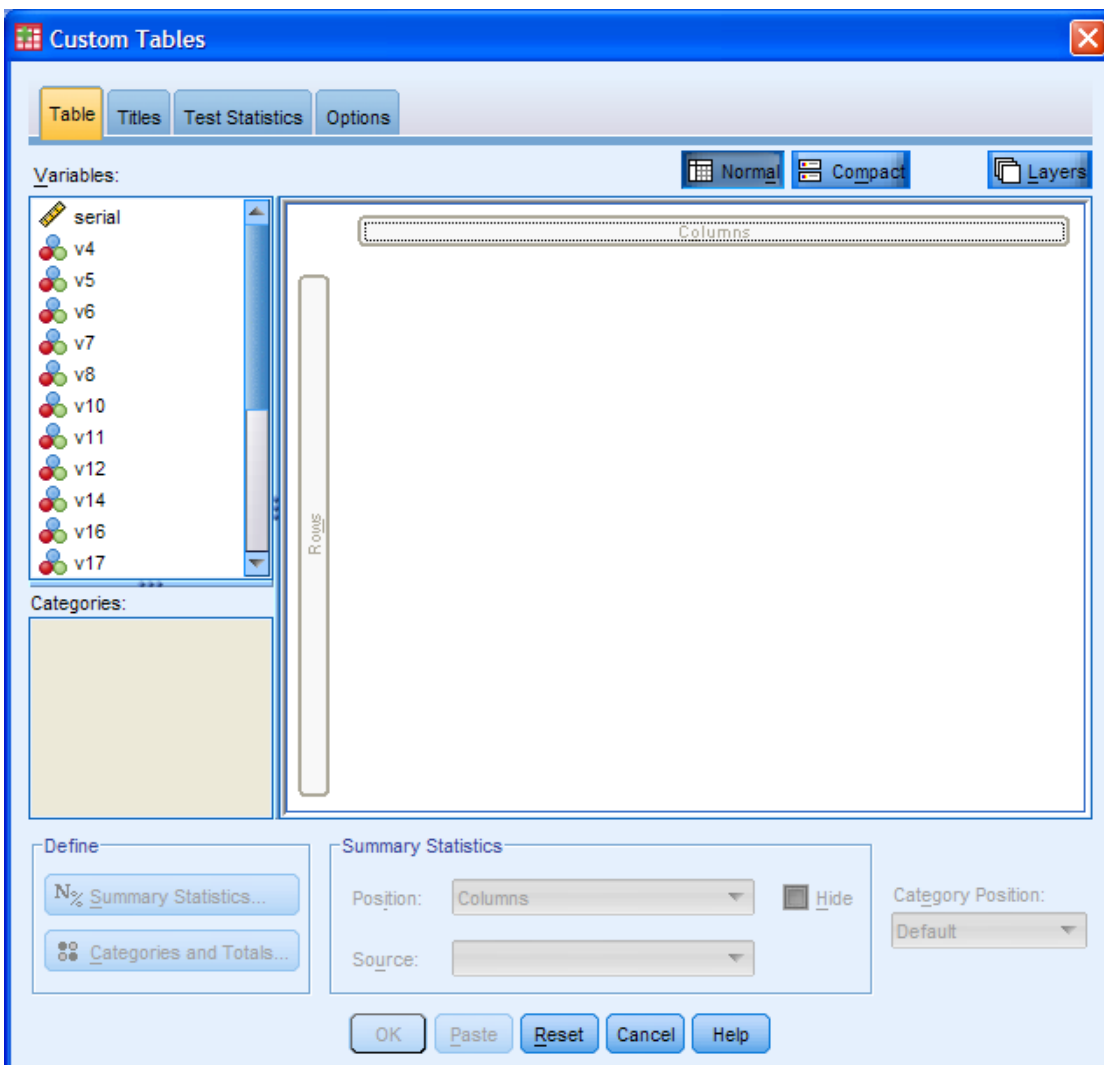
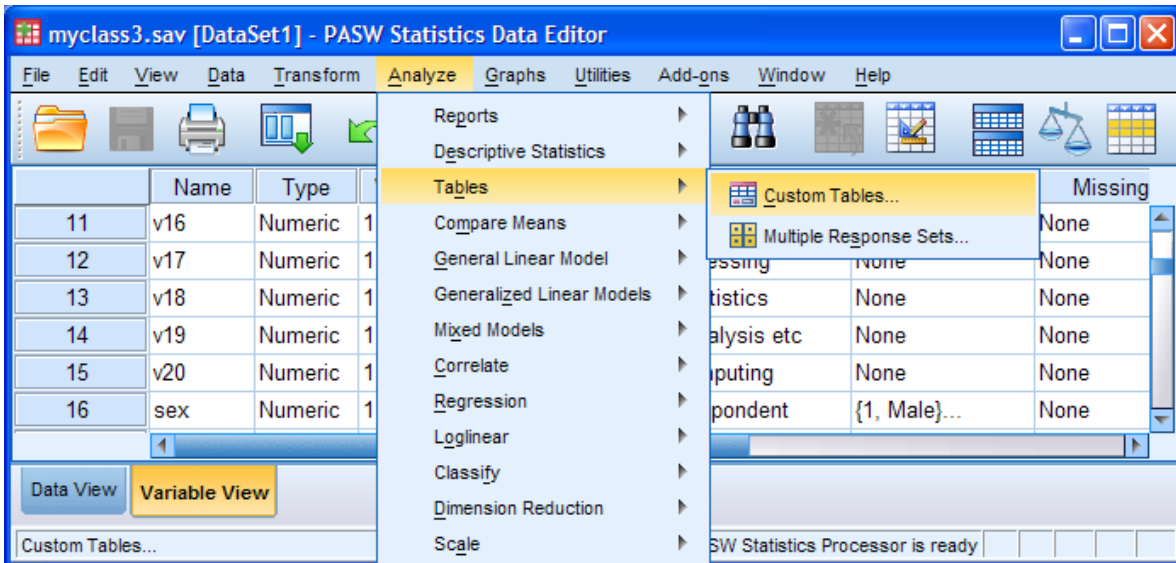
[End of tutorial]

Next tutorial: [3.3.3 Multiple response questions in the 1986 British Social Attitudes survey](#)

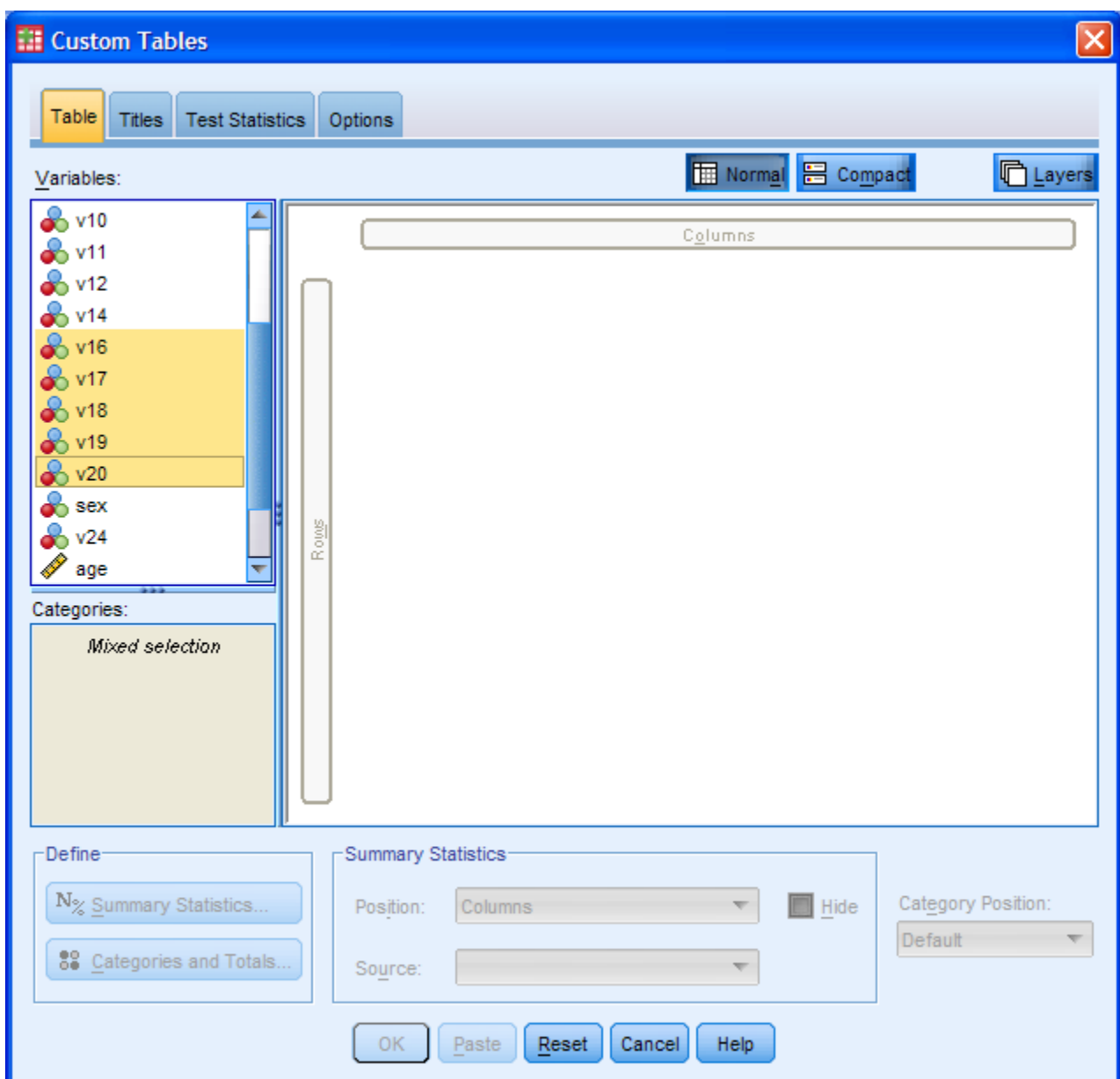
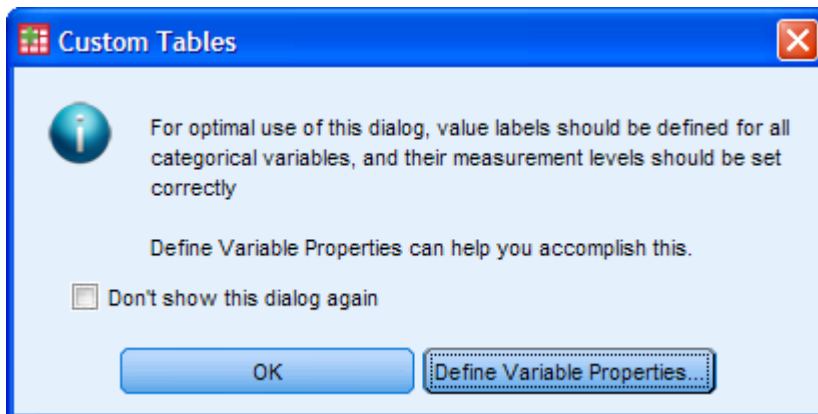
Appendix:

How to produce the summary table of frequencies for V16 to V20

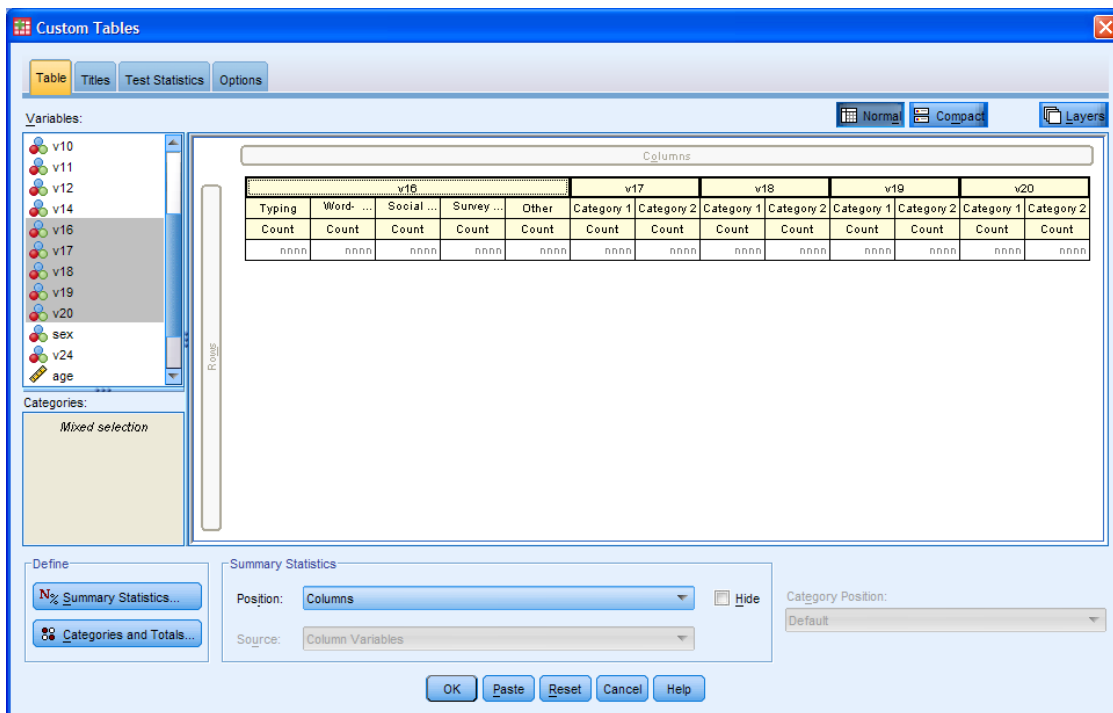
Analyze > Tables > Custom Tables



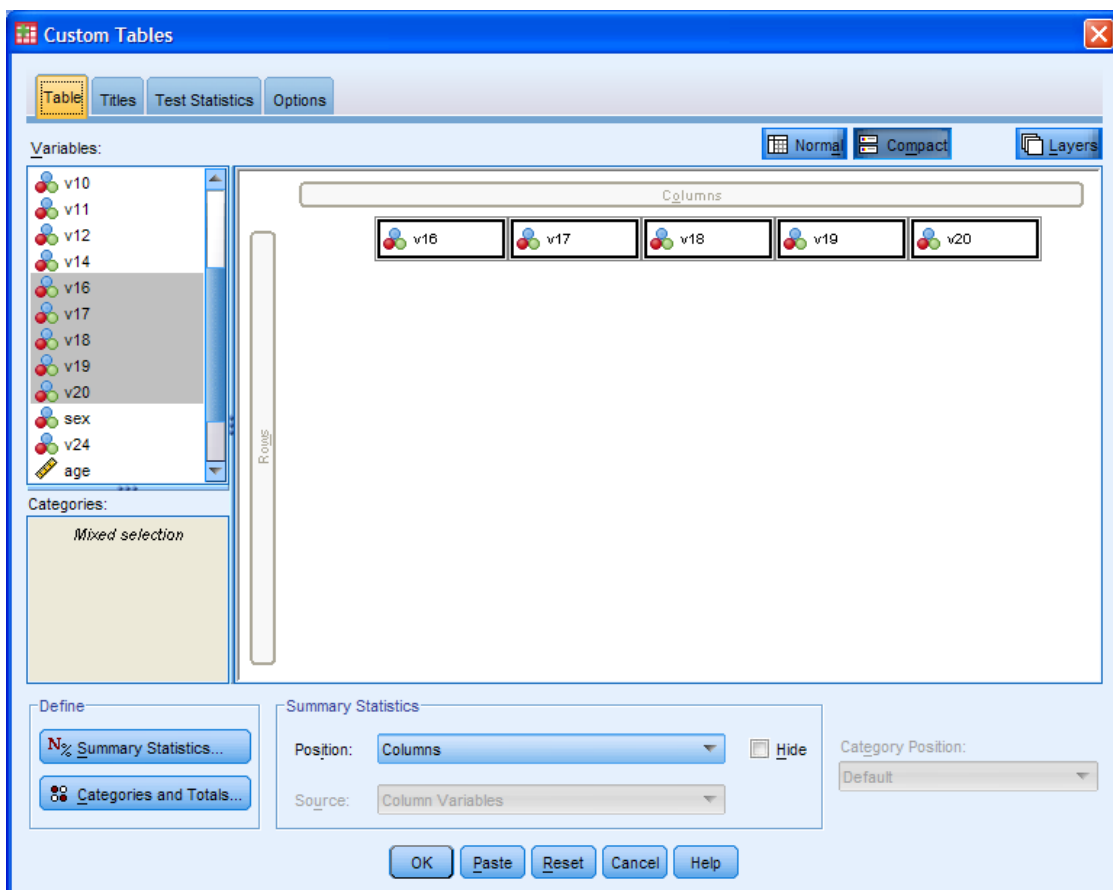
Ignore the message:



Highlight v16 to v20 and drag to columns:



Click on **Compact**



.. then **OK**

[NB: For this example I edited the options to display variable names and values instead of labels: This facility is no longer available from the GUI in 18, so I had to use the following syntax (automatically generated by 15)]

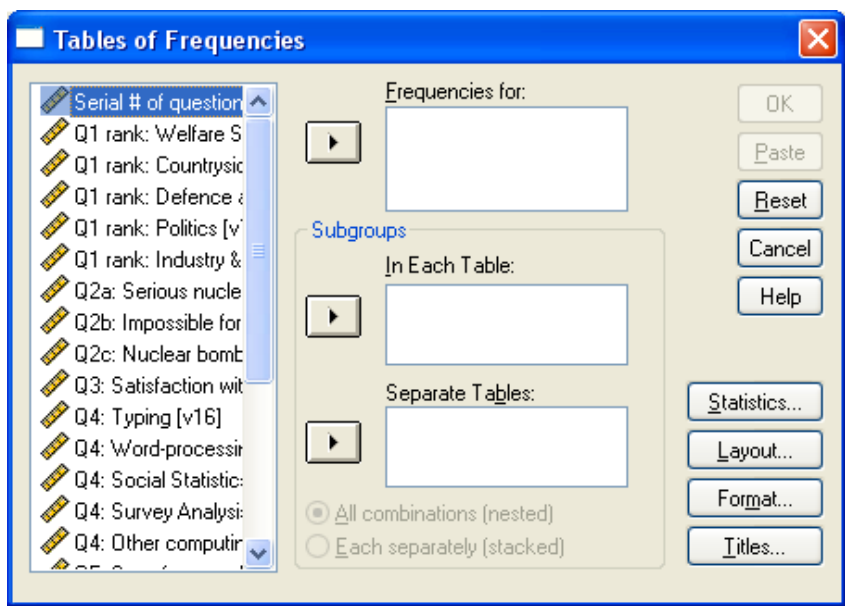
The syntax automatically produced by SPSS for this was:

```

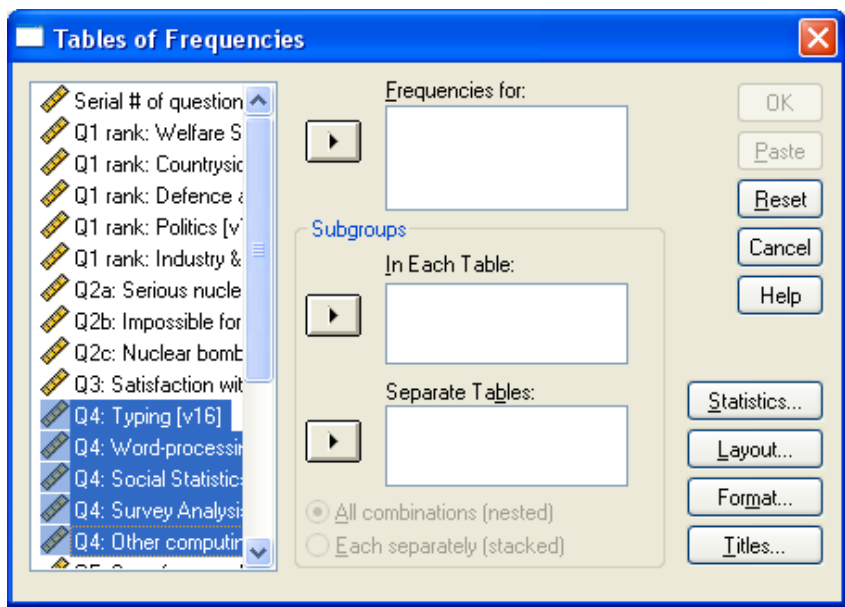
TABLES
  /FORMAT BLANK MISSING('.') /TABLES
  (LABELS) BY
  ( v16 + v17 + v18 + v19 + v20 )
  /STATISTICS COUNT ((F5.0) 'Count' ) .
  
```


The example below uses the GUI in SPSS 15.

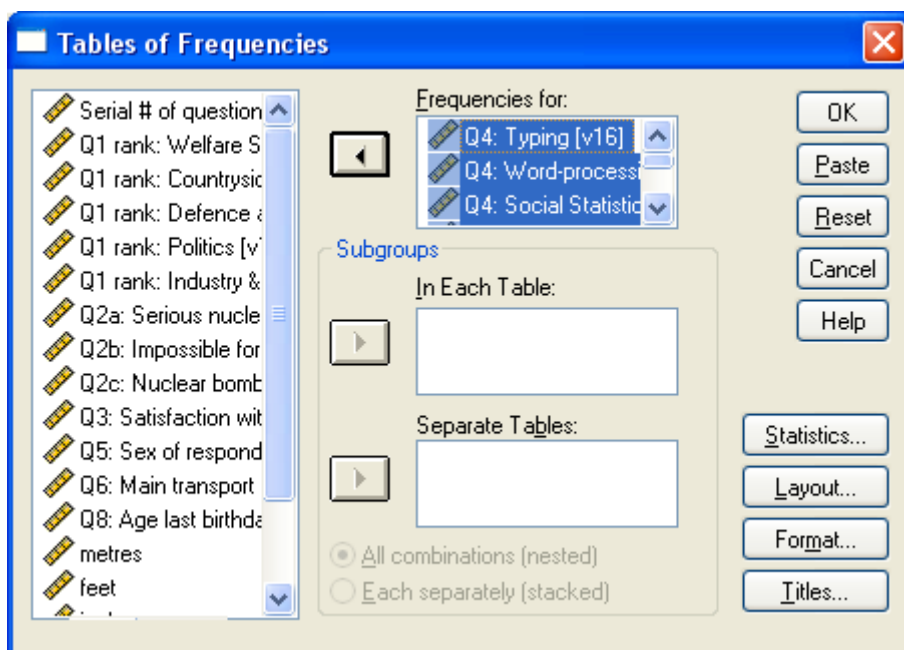
Analyze > Tables > Tables of Frequencies



Highlight the five variables:



and click on  to drag them to the Frequencies box:



Press **OK** to run the job and get the table.

	Q4: (col 16)	Q4: (col 17)	Q4: (col 18)	Q4: (col 19)	Q4: (col 20)
	Count	Count	Count	Count	Count
1	105	1			
2	19	109	2		
3	11	4	46		
4		7	2	19	
5	6	7	21	6	37
6	11				