

TABULATE Footnote Tricks

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INTRODUCTION

Everyone knows how to display a footnote at the bottom of your SAS output, but there's a lot more that you can do with footnotes than that. This paper will show two footnoting tricks you can use with PROC TABULATE. The first trick puts asterisks in a TABULATE table cell that reference a footnote below. The second trick shows how to use a footnote to report statistical results for a TABULATE table.

CREATING FOOTNOTE REFERENCES IN TABLE CELLS

Many times when you build a table you want to add footnotes to explain something about the underlying data.

If the footnote applies to the entire table, it is easy to add a footnote below the table by using a FOOTNOTE statement.

But what if a footnote only applies to a single row or column of the table? An easy solution is to add an asterisk to the appropriate row or column label, and then use the asterisk in the footnote label.

The following code creates a footnote reference in the column heading by changing the variable's label, and a footnote reference in a row heading created by changing the variable's format.

```
PROC FORMAT;
  VALUE FOOTFT 1='Managerial'
              ...other values skipped
              11='Farming**';
RUN;
FOOTNOTE 'SOURCE: XYZ CO. SURVEY';
FOOTNOTE2 '* PART-TIME MEANS <=30 HRS/WK';
FOOTNOTE3 '** NOT INCLUDING SEASONAL EMP.';

PROC TABULATE DATA=TEMP;
  CLASS OCCUP FULLTIME;
  FORMAT OCCUP FOOTFT.;
  TABLE OCCUP='*N=' ,
         FULLTIME='EMPLOYMENT STATUS*'
         *F=10.
         / BOX='NUMBER OF EMPLOYEES'
  ROW=FLOAT;
RUN;
```

The output from this code is shown below.

NUMBER OF EMPLOYEES	EMPLOYMENT STATUS*	
	Full time	Part time
Managerial	670	74
Professional	745	89
Technical	118	16
Sales	373	39
Clerical	562	74
Services	439	47
Manufacturing	567	92
Farming**	51	19

SOURCE: XYZ CO. SURVEY

* PART-TIME MEANS <30 HRS/WK

** NOT INCLUDING SEASONAL EMP.

These types of footnotes are very helpful, but what if you need to reference just a single cell in the table, instead of an entire row or column?

You can put a footnote reference like an asterisk or a footnote number inside a table cell. What you have to do is trick TABULATE by using a format.

First you run the code and determine what value will end up in the table cell where you want to add a footnote reference. Then you assign a special format with an asterisk for that particular value. Then you run the code again and the asterisk will be added to the table cell.

```
PROC FORMAT;
  PICTURE FOOTPIC
    0-18,20-HIGH='0000000000'
    19='00000000**';
RUN;

PROC TABULATE DATA=TEMP;
  CLASS OCCUP FULLTIME;
  TABLE OCCUP='*N=' ,
         FULLTIME='EMPLOYMENT STATUS*'
         *F=FOOTPIC.
         / BOX='NUMBER OF EMPLOYEES'
  ROW=FLOAT;
RUN;
```

The resulting table is shown below.

NUMBER OF EMPLOYEES	EMPLOYMENT STATUS*	
	Full time	Part time
Managerial	670	74
Professional	745	89
Technical	118	16
Sales	373	39
Clerical	562	74
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SOURCE: XYZ CO. SURVEY

* PART-TIME MEANS <30 HRS/WK

** NOT INCLUDING SEASONAL EMP.

This is a great trick for producing customized tables, but be. If your underlying data changes, causing the value in your targeted cell to change, the footnote will disappear from that cell. And it may even appear in an unintended cell if that exact value pops up somewhere else! Also, keep in mind that this approach will not work if the cell where you want to put the footnote does not have a unique value.

CREATING FOOTNOTES WITH STATISTICAL RESULTS

PROC TABULATE is great at doing a lot of things, but calculating statistics is not one of them. If you want to test whether the means displayed in your table are significantly different from zero, you're in luck. This is the one statistical test that TABULATE knows how to do.

Unfortunately, it's pretty rare that this is the statistical test you need. When you're doing a cross-tabulation, the statistic that's most likely to come up is a chi-square test. If you want to find out if the frequency distribution in a table is statistically significant, this is the test that you want.

Luckily for you, there is another way to attach statistical test results to a TABULATE table. All you have to do is run your statistical procedure, output the results to a dataset, and then use a macro variable to add the results to your table as a footnote.

For example, say you've created a table that shows employment status by gender. From looking at your table, it appears as if women hold more part-time jobs. To test this theory, you do a chi-square test on the table using PROC FREQ. The following code shows how to take the test result and add it to the table as a footnote.

```
PROC FREQ DATA=TEMP8 NOPRINT;
  OUTPUT OUT=CHI PCHI;
  TABLES GENDER*FULLTIME / CHISQ;
RUN;
DATA _NULL_;
  SET CHI;
  CALL SYMPUT('CHI',PUT(P_PCHI,8.4));
RUN;
FOOTNOTE "P-VALUE FOR CHI-SQ =
&CHI";
PROC TABULATE DATA=TEMP8;
  CLASS GENDER FULLTIME;
  TABLE GENDER=' ',
    FULLTIME=' *N=' *F=12.;
RUN;
```

The PROC FREQ output is directed to the dataset CHI. A printout of this dataset is below.

OBS	_PCHI_	DF_PCHI	P_PCHI
1	4.70950	1	0.029996

A data step is then used to read in the results and the CALL SYMPUT macro function is used to assign the p-value for the chi-square test to the macro variable CHI. Finally, the macro variable CHI is used in the FOOTNOTE definition to display the p-value at the bottom of the table. The resulting table is shown below.

	Full time	Part time
Male	1978	221
Female	1787	247

* P-VALUE FOR CHI-SQUARE TEST = 0.0300

This approach will work for any statistic that can be output to a dataset. Most SAS statistical procedures support output datasets, though not all statistics are available in these output datasets.

CONCLUSION

These two tricks are just a brief example of how you can use the DATA step, PROC FORMAT and a FOOTNOTE statement to make your TABULATE output more informative. You can employ these approaches with other procedures and types of output. I encourage you to keep them in mind for your next SAS reporting project.

CONTACTING THE AUTHOR

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