

Example 1 — Table of means, standard deviations, and correlations
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Description

In this example, we demonstrate how to use `table` to compute means and standard deviations, run the `pwcorr` command to obtain a correlation matrix, and create a table with all of these statistics. We also demonstrate how you can use `collect` to customize this table.

Remarks and examples

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Remarks are presented under the following headings:

Table of correlations

Table of correlations, means, and standard deviations

Table of correlations

Below, we use data from the Second National Health and Nutrition Examination Survey (NHANES II) (McDowell et al. 1981). We want to create a table to explore the correlation between `age`, `weight`, and systolic blood pressure (`bpsystol`).

Let's begin by looking at the correlations with the `pwcorr` command, which allows us to report the significance levels along with the correlation coefficients.

```
. use https://www.stata-press.com/data/r18/nhanes21
(Second National Health and Nutrition Examination Survey)
. pwcorr age weight bpsystol, sig
```

	age	weight	bpsystol
age	1.0000		
weight	0.0388 0.0001	1.0000	
bpsystol	0.4811 0.0000	0.2861 0.0000	1.0000

`pwcorr` stores the correlations and significance levels in the matrices `r(C)` and `r(sig)`, respectively. Below, we create a matrix called `vech`, which contains the lower triangle elements of the matrix `r(C)`. Then, we list both matrices:

```
. matrix define vech = vech(r(C))
. matrix list r(C)
symmetric r(C) [3,3]
      age      weight      bpsystol
age      1
weight  .03881324      1
bpsystol .48110277      .28607421      1
```

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```
. matrix list vech
vech[6,1]
           c1
    age:age      1
    age:weight  .03881324
    age:bpsystol .48110277
    weight:weight 1
    weight:bpsystol .28607421
    bpsystol:bpsystol 1
```

We can see that `vech()` creates a column vector by stacking elements from the first column of `r(C)`, then the second column, and finally the third column. The variable before the colon is the row equation, and the variable after the colon is the row name.

To create our table, we can use `collect get` to collect the column vectors of both the correlations matrix and the significance levels matrix. We then use `collect layout` to lay out our table. We place the results for each row name on the rows, by interacting `rowname` and `result`, and the row equations (`roweq`) on the columns:

```
. collect get corr=vech(r(C)) sig=vech(r(sig))
. collect layout (rowname#result) (roweq)
Collection: default
  Rows: rowname#result
  Columns: roweq
  Table 1: 9 x 3
```

	Age (years)	Weight (kg)	Systolic blood pressure
Age (years)			
corr	1		
sig	.		
Weight (kg)			
corr	.0388132	1	
sig	.0000782	.	
Systolic blood pressure			
corr	.4811028	.2860742	1
sig	0	3.7e-194	.

This is a good starting point, but instead of displaying the significance levels, we would like to display stars representing those levels. We use `collect stars` to display three stars for values of `sig` less than 0.01, two stars for values less than 0.05, and one star for values less than 0.1. The `attach` option tells Stata to attach these stars to the correlations (`corr`), and `shownote` adds the note explaining the significance levels that the stars represent.

Additionally, rather than displaying a value of 1 for the correlation of a variable with itself, we want to display a dash. We use `collect style cell` to specify that values of `corr` beyond 0.99 should be labeled with a dash. We also format the correlations to four decimal places and center them horizontally. Whereas before we included all results, now we update our table layout to include only the correlations (`result[corr]`):

```
. collect stars sig 0.01 "****" 0.05 "***" 0.1 "*", attach(corr) shownote
. collect style cell result[corr], maximum(0.99, label("-")) nformat(%6.4f)
> halign(center)
. collect layout (rowname#result[corr]) (roweq)
Collection: default
  Rows: rowname#result[corr]
  Columns: roweq
  Table 1: 6 x 3
```

	Age (years)	Weight (kg)	Systolic blood pressure
Age (years) corr	-		
Weight (kg) corr	0.0388***	-	
Systolic blood pressure corr	0.4811***	0.2861***	-

*** p<.01, ** p<.05, * p<.1

This table looks much better, but we can customize it further. Because we are displaying only correlations, we can hide the labels for the results with `collect style header`. Additionally, we will remove the border on the right side of the corner and row-header sections of the table. The dimension `border_block` divides the table into four sections: `corner`, `column-header`, `row-header`, and `item`. This dimension allows us to modify borders for a whole section of the table. Finally, we add a descriptive title with `collect title` and preview our table with `collect preview`:

```
. collect style header result, level(hide)
. collect style cell border_block[corner row-header], border(right, pattern(nil))
. collect title "Table of correlations"
. collect preview
Table of correlations
```

	Age (years)	Weight (kg)	Systolic blood pressure
Age (years)	-		
Weight (kg)	0.0388***	-	
Systolic blood pressure	0.4811***	0.2861***	-

*** p<.01, ** p<.05, * p<.1

We can now export our table in our preferred style—Word, PDF, HTML, L^AT_EX, Excel, or Markdown—using `collect export`.

Table of correlations, means, and standard deviations

Building on our last table, suppose we also want to report the means and standard deviations for each variable. We previously created a column vector with the correlations and significance levels, but for this table, we will create a row vector with those values. The reason is that now we are going to collect other statistics for our table, and the `collect` system uses the dimensions `coleq` (column equation) and `colname` (column name) to identify those results. To align our results, we will need to reference our correlations using column equations and names as well.

To see how this works, let's create another collection for our new table and run our `pwcorr` command again. We will create a row vector of the correlations by transposing (') the column vector of correlations (`vech(r(C))`):

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```
. collect create corr2
(current collection is corr2)
. pwcorr age weight bpsystol, sig
```

	age	weight	bpsystol
age	1.0000		
weight	0.0388 0.0001	1.0000	
bpsystol	0.4811 0.0000	0.2861 0.0000	1.0000

```
. matrix define vechrow = vech(r(C))'
. matrix list r(C)
symmetric r(C)[3,3]
      age      weight      bpsystol
      age      1
      weight  .03881324      1
      bpsystol .48110277  .28607421      1
. matrix list vechrow
vechrow[1,6]
      age:      age:      age:      weight:      weight:      bpsystol:
      age      weight      bpsystol      weight      bpsystol      bpsystol
ci      1      .03881324      .48110277      1      .28607421      1
```

Now, we can identify the correlations by referring to the column equation and column name. We are now ready to create our table.

Previously, we used `collect get` to collect our results, but with the `table` command, we can compute summary statistics and incorporate the results from another Stata command in the same table. This versatility will allow us to compute all our statistics with a single `table` command. With the `statistic()` option, we request the means and standard deviations of the three variables mentioned. With the `command()` option, we execute the `pwcorr` command. We also format the results to display only two digits to the right of the decimal. The arguments before the comma specify how we want to arrange our results. We place the summary statistics (`result`) and column equations on the rows and the column names of the matrix (`colname`) on the columns. We also modified the variable label for `bpsystol` to prevent the table from wrapping.

```
. label variable bpsystol "BP"
. table (result coleq) (colname),
> statistic(mean age weight bpsystol)
> statistic(sd age weight bpsystol)
> command(corr=(vech(r(C))) sig=(vech(r(sig)))):
> pcorr age weight bpsystol, sig) nformat(%5.2f mean sd)
```

	Age (years)	Weight (kg)	BP
Mean			
Mean	47.58	71.90	130.88
Standard deviation			
Standard deviation	17.21	15.36	23.33
corr			
Age (years)			
pcorr age weight bpsystol, sig	1	.0388132	.4811028
Weight (kg)			
pcorr age weight bpsystol, sig		1	.2860742
BP			
pcorr age weight bpsystol, sig			1
sig			
Age (years)			
pcorr age weight bpsystol, sig	.	.0000782	0
Weight (kg)			
pcorr age weight bpsystol, sig		.	3.7e-194
BP			
pcorr age weight bpsystol, sig			.

We will use the `maximum()` option with `collect style cell` to display a dash for correlations between a variable and itself. And we will display stars for levels of significance, as we did with our previous table. Then, we can lay out our table with the variables (`colname`) on the rows and the results on the columns. The means and standard deviations can be identified by levels of `colname` and `result`. However, the correlations are identified by the value of the column name, column equation, and result. Therefore, we interact `coleq` with the level `corr` of `result` in our table layout.

```
. collect style cell result[corr],
> maximum(0.99, label(" - ")) nformat(%6.4f) halign(center)
. collect stars sig 0.01 "***" 0.05 "***" 0.1 "*", attach(corr) shownote
. collect layout (colname) (result[mean sd] coleq#result[corr])
```

```
Collection: Table
  Rows: colname
  Columns: result[mean sd] coleq#result[corr]
  Table 1: 3 x 5
```

	Mean	Standard deviation	Age (years) corr	Weight (kg) corr	BP corr
Age (years)	47.58	17.21	-		
Weight (kg)	71.90	15.36	0.0388***	-	
BP	130.88	23.33	0.4811***	0.2861***	-

*** p<.01, ** p<.05, * p<.1

We now have the layout we want, but we will make a few modifications to polish the table further. First, we will hide the label "corr" with `collect style header`. Then, we will shorten the label for the standard deviations with `collect label levels`. Rather than repeating the variable labels on the rows and columns, we want to create an index for the variables and use those numbers in

the column headers. We can do this by simply modifying the labels for the levels of `colname` and `coleq`. Then, we preview our table:

```
. collect style header result[corr], level(hide)
. collect label levels result sd "SD", modify
. collect label levels colname age "1. Age" weight "2. Weight"
> bpsystol "3. Systolic BP", modify
. collect label levels coleq age "1" weight "2" bpsystol "3", modify
. collect preview
```

	Mean	SD	1	2	3
1. Age	47.58	17.21	-		
2. Weight	71.90	15.36	0.0388***	-	
3. Systolic BP	130.88	23.33	0.4811***	0.2861***	-

*** p<.01, ** p<.05, * p<.1

Finally, we will center the column headers for the column equations, remove the borders on the right side of the corner and row headers, and provide a title for the table. Both `border_block` and `cell_type` divide the table into four sections; the former is used to modify borders, and the latter is used to modify all other appearance styles for the cells. After we make these changes, we preview our table for the last time.

```
. collect style cell cell_type[column-header]#coleq, halign(center)
. collect style cell border_block[corner row-header], border(right, pattern(nil))
. collect title "Descriptive statistics and correlations"
. collect preview
```

Descriptive statistics and correlations

	Mean	SD	1	2	3
1. Age	47.58	17.21	-		
2. Weight	71.90	15.36	0.0388***	-	
3. Systolic BP	130.88	23.33	0.4811***	0.2861***	-

*** p<.01, ** p<.05, * p<.1

Reference

McDowell, A., A. Engel, J. T. Massey, and K. Maurer. 1981. Plan and operation of the Second National Health and Nutrition Examination Survey, 1976–1980. *Vital and Health Statistics* 1(15): 1–144.

Also see

[R] [table](#) — Table of frequencies, summaries, and command results

[TABLES] [collect style column](#) — Collection styles for column headers

[TABLES] [collect style header](#) — Collection styles for hiding and showing header components

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