

### Correlation Example<sup>1</sup>

Years Since PhD			Number of Publications			
$X$	$X - \bar{X}$	$(X - \bar{X})^2$	$Y$	$Y - \bar{Y}$	$(Y - \bar{Y})^2$	$(X - \bar{X})(Y - \bar{Y})$
3	-4.67	21.81	18	-1.93	3.72	9.01
6	-1.67	2.79	3	-16.93	286.62	28.27
3	-4.67	21.81	2	-17.93	321.48	83.73
8	0.33	0.11	17	-2.93	8.58	-0.97
9	1.33	1.77	11	-8.93	79.74	-11.88
6	-1.67	2.79	6	-13.93	194.04	23.26
16	8.33	69.39	38	18.07	326.52	150.52
10	2.33	5.43	48	28.07	787.92	65.40
2	-5.67	32.15	9	-10.93	119.46	61.97
5	-2.67	7.13	22	2.07	4.28	-5.53
5	-2.67	7.13	30	10.07	101.40	-26.89
6	-1.67	2.79	21	1.07	1.14	-1.79
7	-0.67	0.45	10	-9.93	98.60	6.65
11	3.33	11.09	27	7.07	49.98	23.54
18	10.33	106.71	37	17.07	291.38	176.33
$\bar{X} = 7.67$		$\sum(X - \bar{X})^2 = 293.33$	$\bar{Y} = 19.93$		$\sum(Y - \bar{Y})^2 = 2674.93$	$\sum(X - \bar{X})(Y - \bar{Y}) = 581.67$

$$r = \frac{\sum(X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum(X - \bar{X})^2 \sum(Y - \bar{Y})^2}}$$

$$= \frac{581.67}{\sqrt{(293.33)(2674.93)}}$$

$$= \frac{581.67}{885.8} = .66$$

$$t = \frac{r\sqrt{N-2}}{\sqrt{1-r^2}}$$

$$= \frac{.66\sqrt{13}}{\sqrt{1-.66^2}}$$

$$= \frac{2.38}{.75}$$

$$= 3.17$$

$$df = N - 2 = 15 - 2 = 13, t_{crit, \alpha=.05} = 2.160$$

A Pearson correlation coefficient was computed to examine the relationship between a faculty member's number of years of experience and his or her number of peer-reviewed publications. There was a significant positive correlation between the time since a faculty member received his or her Ph.D. and his or her number of publications,  $r = .66$ ,  $p < .01$ , indicating that, in general, faculty with more years of experience had more publications. There was a strong relationship between these two variables, because more than 40% of their variance was shared ( $r^2 = .44$ ).

<sup>1</sup> Numerical example from Cohen, Cohen, West, & Aiken (2003), Table 2.2.2.

## Syntax

```
get file='c:\jason\spsswin\da2\c&c2_2_2.sav'.
```

```
correlations vars=yrsphd numpubs.
```

## Correlations

Correlations

		yrsphd	numpubs
yrsphd	Pearson	1	.657(**)
	Correlation		
	Sig. (2-tailed)	.	.008
	N	15	15
numpubs	Pearson	.657(**)	1
	Correlation		
	Sig. (2-tailed)	.008	.
	N	15	15

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