Hand Computation Example of Data from Cohen Table 2.2.2

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

Unstandardized regression coefficient:

$$B_1=\frac{\sum(X-\bar{X})(Y-\bar{Y})}{\sum(X-\bar{X})^2}$$
$$=\frac{581.67}{293.33}$$
$$=1.98$$

Intercept:

$$B_0=\bar{Y}-B_1\bar{X}$$
$$=19.93-1.98(7.67)$$
$$=4.74$$

Regression line:

$$\hat{Y}=4.74+1.98X$$

Standardized regression coefficient:

$$sd_x=\sqrt{\frac{\sum(X-\bar{X})^2}{n-1}}=\sqrt{\frac{293.33}{15-1}}=4.58$$
$$sd_y=13.82$$
$$\beta_1=B_1\left(\frac{sd_x}{sd_y}\right)=1.98\left(\frac{4.58}{13.82}\right)=.66$$

A simple regression analysis was conducted to examine the relationship between the years of experience of a faculty member and his or her number of peer-reviewed publications. Results indicated that the years of experience significantly predicted the number of publications, b = 1.98, SE = .632, β = .66. For each additional year of experience, the faculty member published approximately 2 (1.98) additional publications. Years of experience accounted for a large percentage of variance in the number of publications, R^2 = .44.

SPSS Example of Simple Regression

Syntax

```
regression vars=yrsphd numpubs
    /descriptives=mean stddev corr sig n
    /statistics=anova coeff ses r ci
    /dependent=numpubs
     /method=enter yrsphd.
```

Descriptive Statistics

	Mean	Std. Deviation	N
yrsphd	7.6667	4.57738	15
numpubs	19.9333	13.82269	15

Correlations

		yrsphd	numpubs
Pearson Correlation	yrsphd	1.000	.657
	numpubs	.657	1.000
Sig. (1-tailed)	yrsphd	.	.004
	numpubs	.004	.
N	yrsphd	15	15
	numpubs	15	15

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	yrsphd[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: numpubs

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.657[a]	.431	.387	10.81848

a. Predictors: (Constant), yrsphd

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1153.419	1	1153.419	9.855	.008[a]
	Residual	1521.515	13	117.040		
	Total	2674.933	14			

a. Predictors: (Constant), yrsphd

b. Dependent Variable: numpubs

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta	Std. Error			Lower Bound	Upper Bound
1	(Constant)	4.731	5.591			.846	.413	-7.347	16.808
	yrsphd	1.983	.632	.657	.209	3.139	.008	.618	3.348

a. Dependent Variable: numpubs