

PEARSON'S r IN SPSS AND PSPP

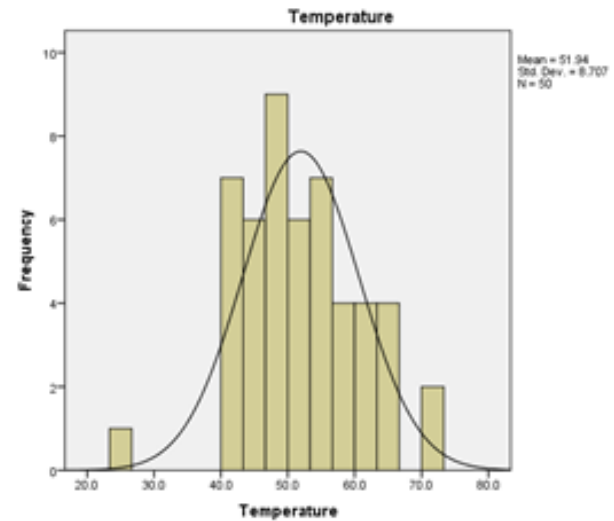
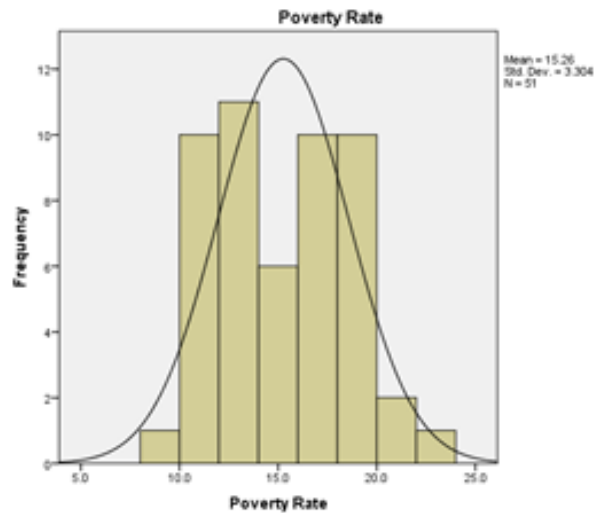
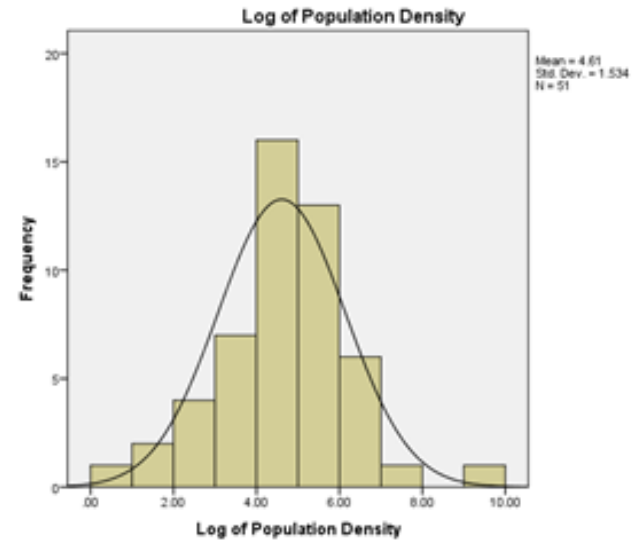
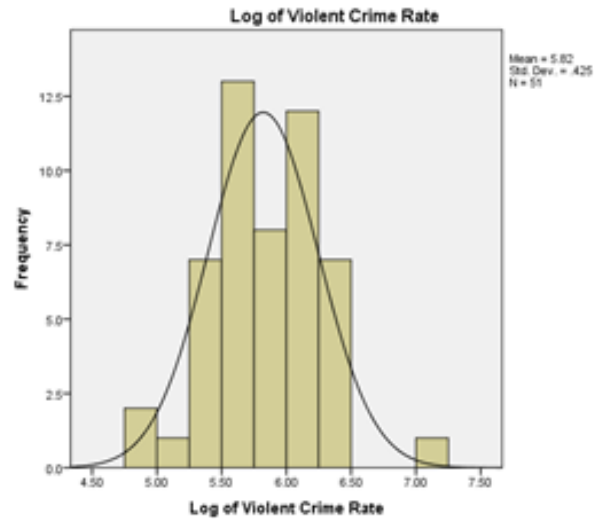
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Pearson's r

- Used if both the independent and dependent variables are numeric
- Named after Karl Pearson (1857-1936)
- Known by many other names
 - Pearson's product-moment coefficient
 - Correlation statistic
- Referred to using the symbol r . Always use "little r ," not capital R , which stands for something else.
- Elements: direction, magnitude, statistical significance

Example

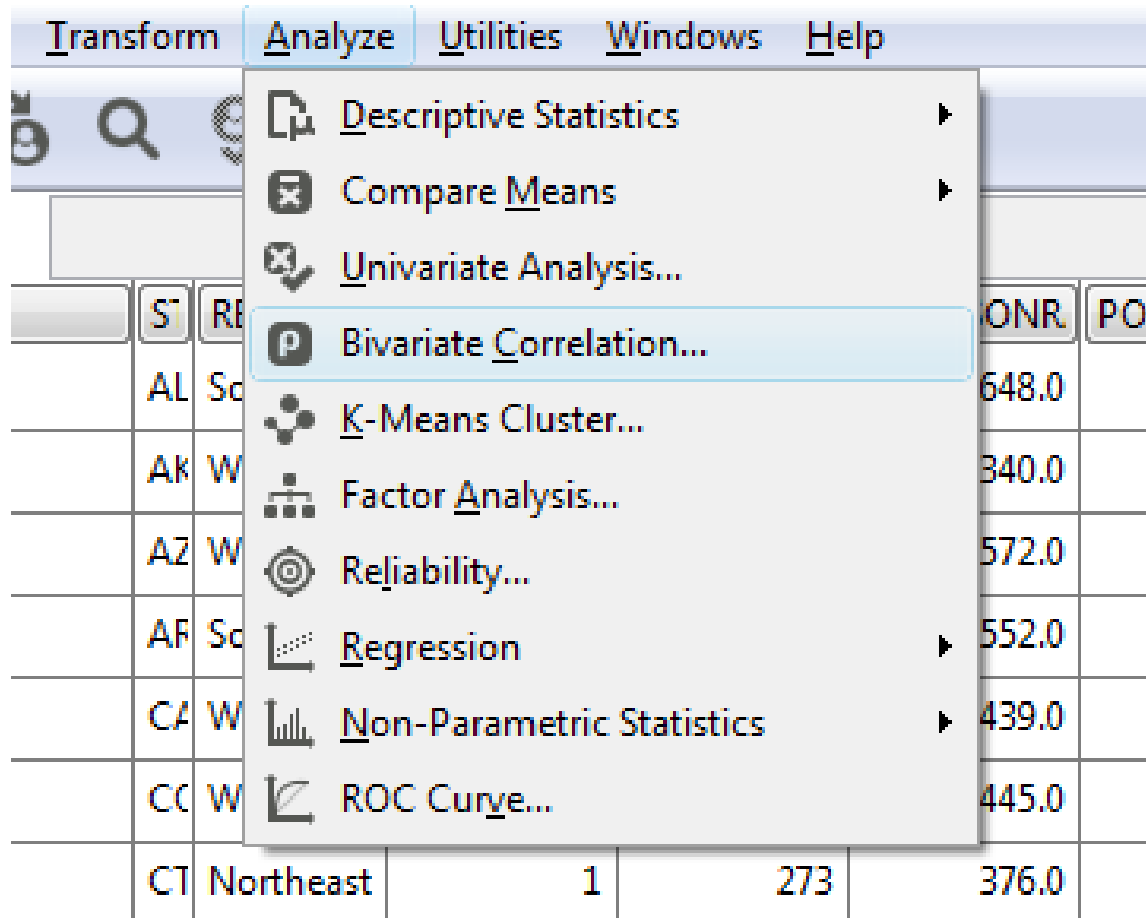


Analyze > Descriptive Statistics > Bivariate

The screenshot shows the SPSS software interface with the 'Analyze' menu open. The 'Descriptive Statistics' sub-menu is selected, and the 'Correlate' option is highlighted. The 'Bivariate...' option is further highlighted in a yellow box. The 'Type' column on the left lists various data types, and the 'Values' column on the right lists various statistical values.

Type	Menu Item	Label	Values	Mis
String	Reports			
String	Descriptive Statistics			
String	Tables			
String	Compare Means			
String	General Linear Model			
Numeric	Generalized Linear Models			
Numeric	Mixed Models			
Numeric	Correlate			
Numeric	Regression			
Numeric	Loglinear			
Numeric	Neural Networks			
Numeric	Classify			
Numeric	Dimension Reduction			
Numeric	Scale			

Analyze > Bivariate Correlation



The image shows a screenshot of the SPSS software interface. The 'Analyze' menu is open, and the 'Bivariate Correlation...' option is highlighted. The background shows a data grid with columns labeled 'S', 'R', 'ONR', and 'PO'. The 'S' column contains state abbreviations (AL, AK, AZ, AF, CA, CC, CT) and 'Northeast'. The 'R' column contains 'Sc' and 'W'. The 'ONR' column contains numerical values (648.0, 340.0, 572.0, 552.0, 439.0, 445.0, 376.0). The 'PO' column contains '1' and '273'.

	S	R	ONR	PO
	AL	Sc	648.0	
	AK	W	340.0	
	AZ	W	572.0	
	AF	Sc	552.0	
	CA	W	439.0	
	CC	W	445.0	
	CT	Northeast	1	273
				376.0

Bivariate Correlations

Bivariate Correlations

Variables:

- Region [REG]
- Violent Crime Rate [VIO...]
- Imprisonment Rate [IMPR...]
- Poverty Rate [POVERTYR...]
- Population [POPULATION]
- Population Density [POP...]
- Black Percent [BLACKPCT]
- Death Penalty [DEATHPEN]
- Education Level [EDUCI...]

Log of Violent Crime Rate [In...]
Log of Population Density [In...]
Urban Percent [URBANPCT]
Temperature [TEMP]

Correlation Coefficients

Pearson Kendall's tau-b Spearman

Test of Significance

Two-tailed One-tailed

Flag significant correlations

Options...
Bootstrap...

OK Paste Reset Cancel Help

SPSS Output

Correlations

		Log of Violent Crime Rate	Log of Population Density	Urban Percent	Temperature
Log of Violent Crime Rate	Pearson Correlation		.301*	.436**	.415**
	Sig. (2-tailed)		.032	.001	.003
	N	51	51	51	50
Log of Population Density	Pearson Correlation	.301	1	.503**	.446**
	Sig. (2-tailed)	.032		.000	.001
	N	51	51	51	50
Urban Percent	Pearson Correlation	.436**	.503**	1	.216
	Sig. (2-tailed)	.001	.000		.131
	N	51	51	51	50
Temperature	Pearson Correlation	.415**	.446**	.216	1
	Sig. (2-tailed)	.003	.001	.131	
	N	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

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

Interpreting Output

.301*

.032

51

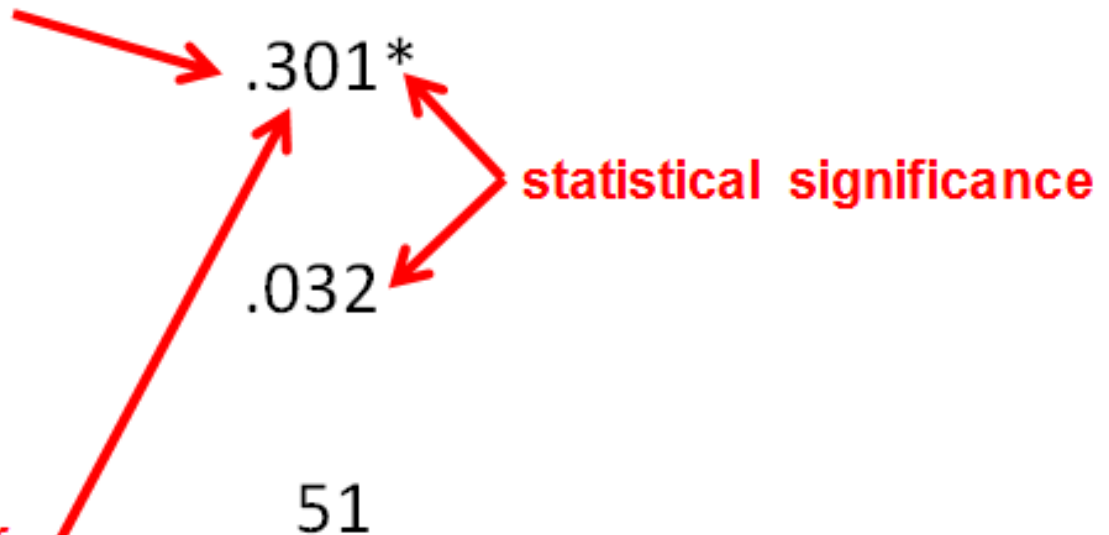
Interpreting Output

Sign = Direction
Positive = Positive
Negative = Negative

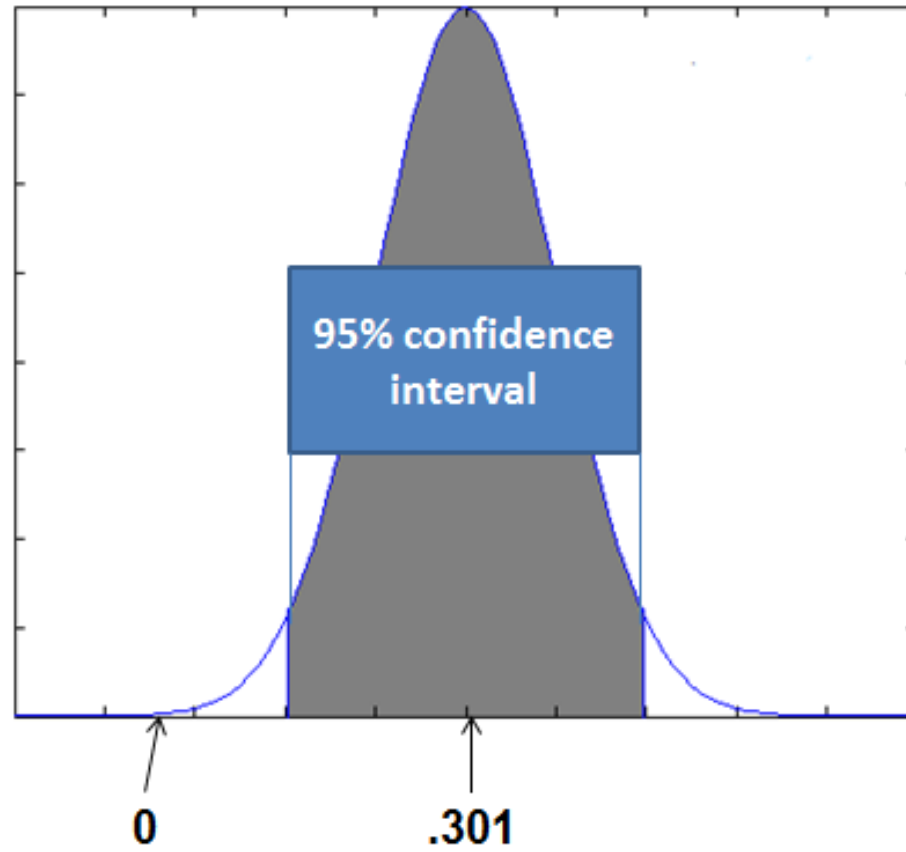
magnitude =
coefficient w/o sign

standardized number
ranging from -1 to 1

lack of relationship:
 $r = 0$



Null Hypothesis



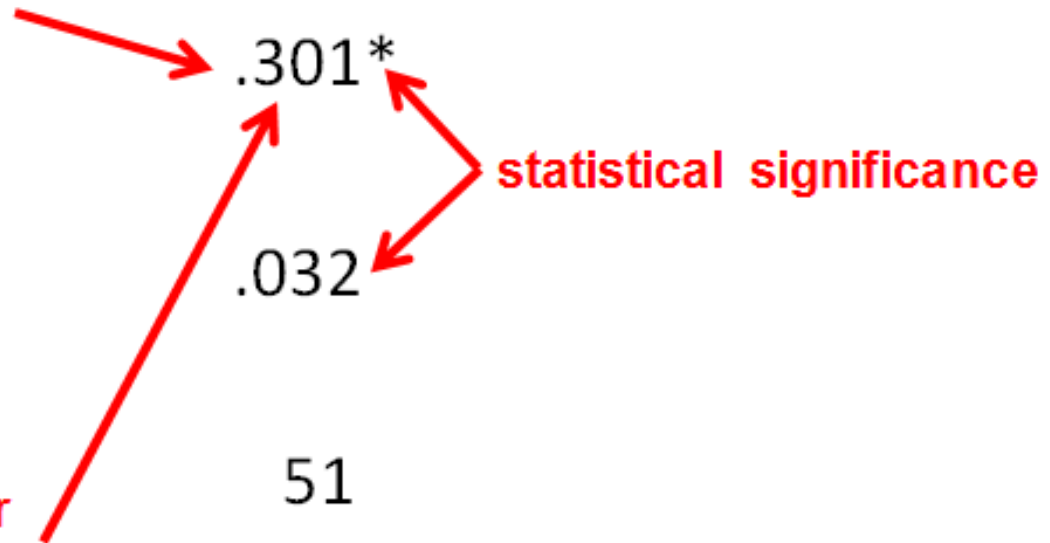
Interpreting Output : Asterisks

Sign = Direction
Positive = Positive
Negative = Negative

magnitude =
coefficient w/o sign

standardized number
ranging from -1 to 1

lack of relationship:
 $r = 0$



SPSS Output: Footnote

Correlations

		Log of Violent Crime Rate	Log of Population Density	Urban Percent	Temperature
Log of Violent Crime Rate	Pearson Correlation	1	.301*	.436**	.415**
	Sig. (2-tailed)		.032	.001	.003
	N	51	51	51	50
Log of Population Density	Pearson Correlation	.301*	1	.503**	.446**
	Sig. (2-tailed)	.032		.000	.001
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	N	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

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

Interpreting Output

Sign=Direction

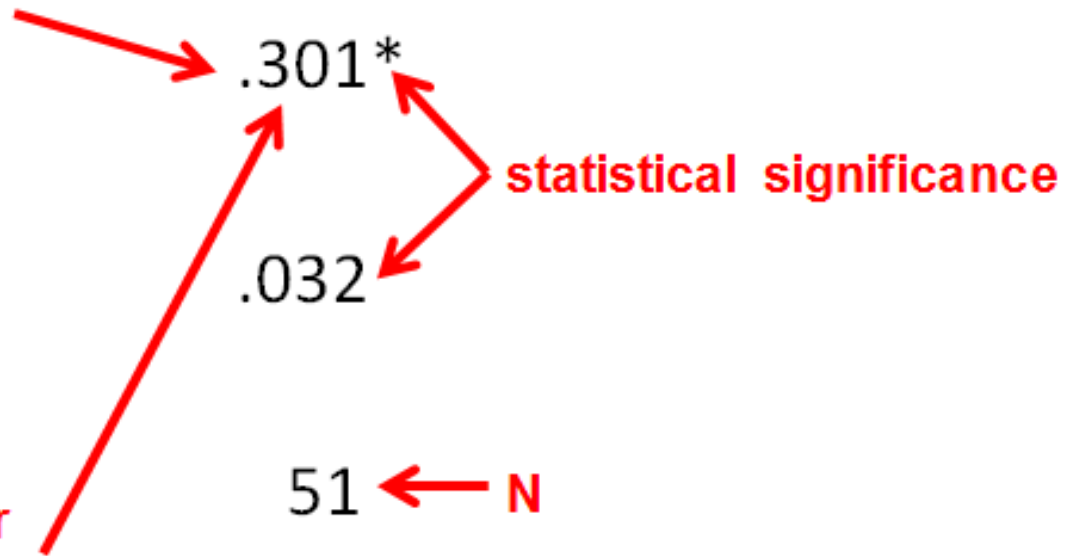
Positive = Positive

Negative = Negative

magnitude =
coefficient w/o sign

standardized number
ranging from -1 to 1

lack of relationship:
r = 0



Formula for Pearson's r

Distance of X
from its mean

Distance of Y
from its mean

$$r_{x,y} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{s_x s_y}$$

Multiply the two standard
deviations together

SPSS Output: Symmetry

Correlations

		Log of Violent Crime Rate	Log of Population Density	Urban Percent	Temperature
Log of Violent Crime Rate	Pearson Correlation		.301*	.436**	.415**
	Sig. (2-tailed)		.032	.001	.003
	N	51	51	51	50
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	N	51	51	51	50
Temperature	Pearson Correlation	.415**	.446**	.216	1
	Sig. (2-tailed)	.003	.001	.131	
	N	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

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

SPSS Output: Diagonal

Correlations

		Log of Violent Crime Rate	Log of Population Density	Urban Percent	Temperature
Log of Violent Crime Rate	Pearson Correlation	1	.301*	.436**	.415**
	Sig. (2-tailed)		.032	.001	.003
	N	51	51	51	50
Log of Population Density	Pearson Correlation	.301*	1	.503**	.446**
	Sig. (2-tailed)	.032		.000	.001
	N	51	51	51	50
Urban Percent	Pearson Correlation	.436**	.503**	1	.216
	Sig. (2-tailed)	.001	.000		.131
	N	51	51	51	50
Temperature	Pearson Correlation	.415**	.446**	.216	1
	Sig. (2-tailed)	.003	.001	.131	
	N	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

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

APA Table

Table 2

Correlation Matrix

	Log of Violent Crime	Log of Pop. Density	% Urban
Temperature	.42**	.45**	.22
% urban	.44**	.50**	
<u>Log of pop. density</u>	.30*		

Note: * $p < .05$ ** $p < .01$

The End

- Used if both the independent and dependent variables are numeric
- Gives a standardized result between -1 and 1.
- Elements: direction, magnitude, statistical significance