

Categorization & Typicality

Data Analysis & Results

Study Limitations

- ❖ No control for: different word lengths, familiarity, or word frequency.
- ❖ Items not selected to represent a range of typicality.
- ❖ Typicality ratings—is there a better way to get them?

Correlation

- ❖ A statistic for describing the relationship between two variables.
 - Number of cigarettes smoked and number of cases of lung cancer (or heart disease, or stroke)
 - Number of hours of studying and score on an exam

What does the correlation coefficient mean?

It is a measure of the degree to which x and y vary together

Correlation

❖ Can vary from

– -1 (perfect negative correlation)

– through 0 (no correlation)

– to +1 (perfect positive correlation)

Correlation: Scatter Plot

Scatter diagram

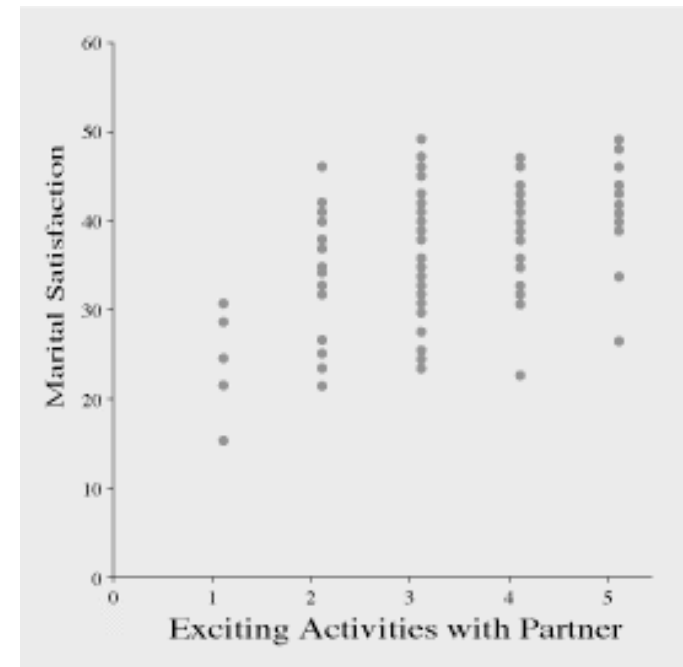
Graph that shows the degree
and pattern of the relationship
between two variables

Horizontal axis

Usually the variable that does
the predicting
e.g., price, studying, income,
caffeine intake

Vertical axis

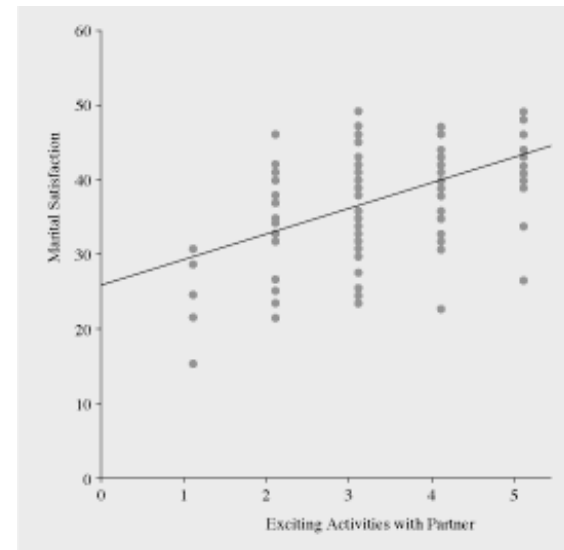
Usually the variable that is
predicted
e.g., quality, grades, happiness,
alertness



Correlation

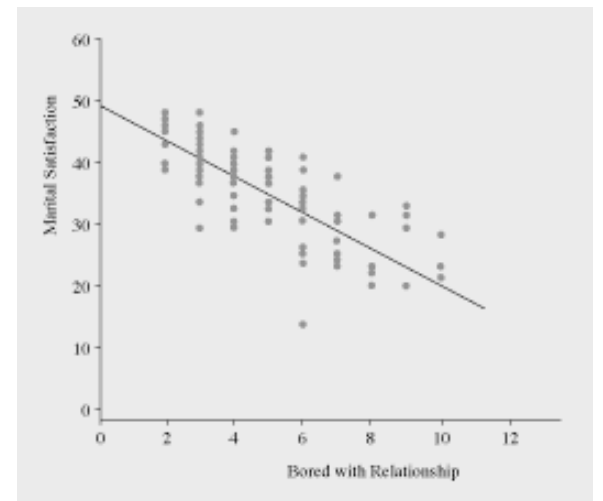
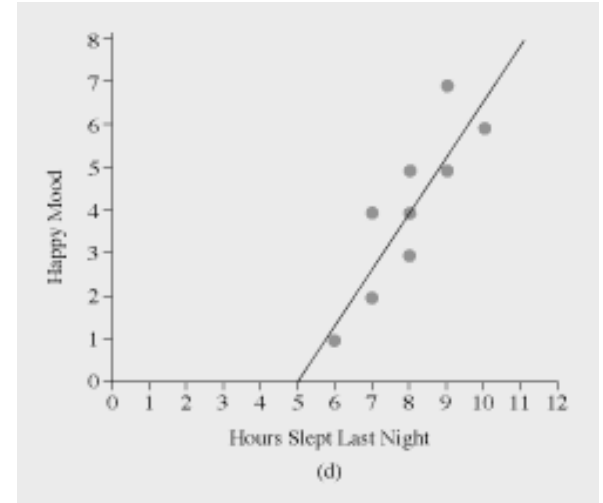
❖ Linear Correlation

The pattern on a scatter diagram is a straight line



Correlation

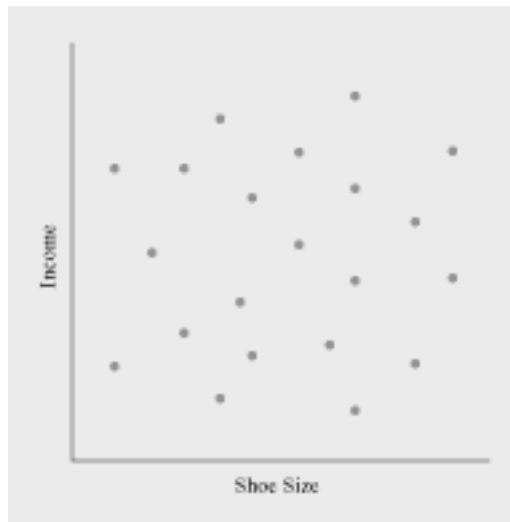
- ❖ Positive linear correlation
 - **High** scores on one variable matched by **high** scores on another
 - Line slants *up* to the right
- ❖ Negative linear correlation
 - **High** scores on one variable matched by *low* scores on another
 - Line slants *down* to the right



Correlation

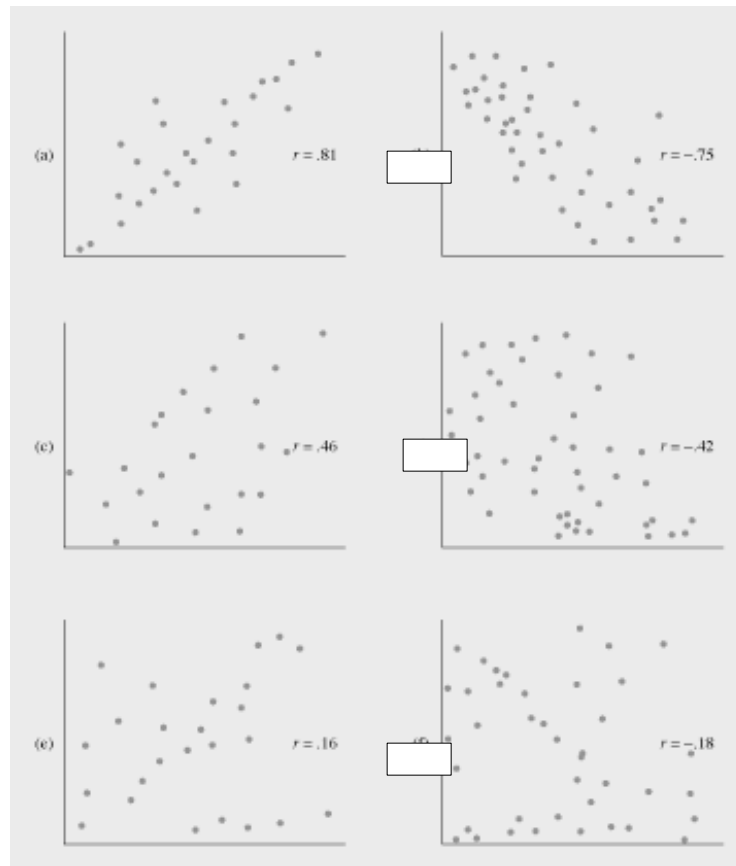
❖ Zero correlation

- No line, straight or otherwise, can be fit to the relationship between the two variables
- Two variables are said to be “uncorrelated”



Correlation Coefficient Examples

$r = .81$



$r = -.75$

$r = .46$

$r = -.42$

$r = .16$

$r = -.18$

Correlation Output

Correlations

		AGE	INCOME
AGE	Pearson Correlation	1.000	.971**
	Sig. (2-tailed)	.	.000
	N	9	9
INCOME	Pearson Correlation	.971**	1.000
	Sig. (2-tailed)	.000	.
	N	9	10

Correlation
Coefficient

p-value

** . Correlation is significant at the 0.01 level

α -level

Correlation and causality

- ❖ Correlation does not necessarily suggest a causal relation between the variables.
- ❖ When two variables are correlated, three possible directions of causality:
 - 1st variable causes 2nd.
 - 2nd variable causes 1st.
 - Some 3rd variable causes both the 1st and the 2nd.
- ❖ There is inherent ambiguity in correlations.

Predictions

- ❖ Correlations can be used to make predictions about scores; through regression:

$$Y = a + bX$$

- ❖ **Predictor:** X variable (the predicting variable).
- ❖ **Criterion:** Y variable (variable being predicted).

Important points of correlations

- ❖ Relationships between two variables.
- ❖ The **strength** of the relationship:
 - is indicated by the correlation coefficient: r
 - but is actually measured by the coefficient of determination: r^2
- ❖ The **significance** of the relationship:
 - is expressed in probability levels: p (e.g., significant at $p < .05$)
 - This tells how **unlikely** a given correlation coefficient, r , will occur given **no** relationship in the population.
- ❖ **NOTE:** The smaller the **p -level**, the more sure you are that the relationship is reliable, but... the larger the **correlation**, the stronger the relationship.

*For the typicality experiment:
Conceptual hypothesis*

- ❖ Typicality plays a role in categorization.
We are looking for the nature of mental representation:
Definitional or probabilistic?
- ❖ **Independent Variable:**
 - Typicality (rating 1-7)
- ❖ **Dependent Variable:**
 - Reaction time (milliseconds) to confirm category membership.

Operationalized Hypothesis

- ❖ As typicality rating increases, RT to confirm the membership of a given thing to a given category decreases...

“the more typical an item is, the faster the confirmation”

SPSS – the basics

- ❖ Used in the social sciences for statistical analyses of data.
- ❖ Powerful add-ons for economic and financial trends analysis.
- ❖ Along with SAS, most common in the academic and real world.

SPSS – the basics

- ❖ Three main screens you will use:
 - **Data (.sav)**: the spreadsheet with your data (similar to Excel, comprised of columns and rows).
 - **Syntax (.sps)**: a window to write and document analyses you perform (always save these).
 - **Output (.spo)**: the window that will give you tables and graphs.

SPSS – the basics

- ❖ Download the data file from my web site: your data and the class data.
- ❖ Save it in a folder (Cognition Lab).
- ❖ Open your data first.

SPSS – syntax file

- ❖ Pasting from menu commands in SPSS.
- ❖ Writing your own syntax.
- ❖ Be sure to document what you do by making notes in the syntax.
- ❖ Do this by starting a line with an * and ending with a period.
- ❖ Example:
 - *** This syntax runs correlations for reaction time and typicality ratings .