

Questions on Homework

Oct 12-8:07 PM

Feb 22-10:36 AM

- Learning Targets**
- I can estimate and interpret a linear correlation coefficient.
 - I understand the properties of a linear correlation coefficient.
 - I can use a calculator to find the correlation (r).
 - I understand the difference between correlation and causation.
 - I can identify possible lurking variables in bivariate data.
 - I understand the effects that outliers and influential points can have on the linear correlation coefficient.

Correlation

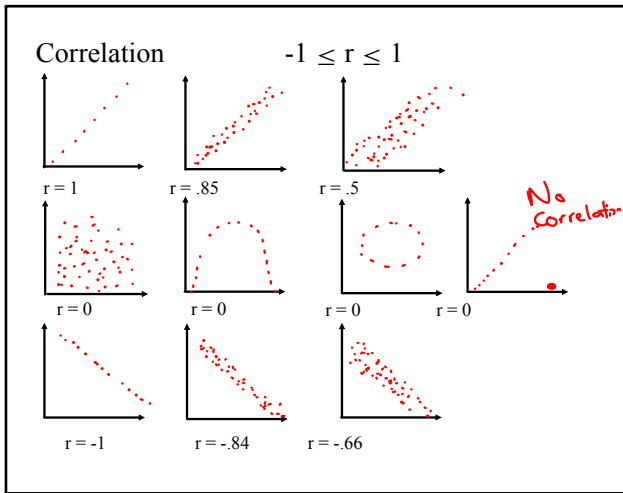
Statistical measure that describes the direction and strength of a **straight-line** relationship between two variables.

Represented by the letter r .

Is a number **between -1 and 1** ($-1 \leq r \leq 1$)

Nov 6-8:15 AM

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Strength of r

$1 =$ perfect positive
 $.9 < r < 1 =$ strong positive
 $.7 < r < .9 =$ moderate positive
 $0 < r < .7 =$ weak positive
 $r = 0$ means no correlation
 $-.7 < r < 0$ weak negative
 $-.9 < r < -.7$ moderate negative
 $-1 < r < -.9$ strong negative
 $-1 =$ perfect negative

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Finding r

Chevrolet Camaro	3.545	30
Dodge Neon	2.6	32
Honda Accord	3.245	30
CityLincoln Continental	3.93	24
Oldsmobile Aurora	3.995	26
CityPontiac Grand Am	3.115	30
Mitsubishi Eclipse	3.235	33
BMW 3-Series	3.225	27
Honda Civic	2.44	37
CityToyota Camry	3.24	32
Hyundai Accent	2.29	37
Mazda Protg	2.5	34
Cadillac DeVille	4.02	26

$r = -.89$
 direction: negative
 strength: moderate

Find the correlation between weight of a car (in thousands of pounds) and gas mileage (miles per gallon)

Oct 4-10:49 PM

20	88.6
16	71.6
19.8	93.3
18.4	84.3
17.1	80.6
15.5	75.2
14.7	69.7
17.1	82
15.4	69.4
16.2	83.3
15	79.6
17.2	82.6
16	80.6
17	83.5
14.4	76.3

direction: + correlation
 strength: .84

Find the correlation between cricket chirps and temperature.

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A high correlation between two variables does not mean that one caused the other (or that there is a cause and effect relationship).

Sometimes there is a cause and effect relationship if 2 variables are highly correlated but many times it is just a coincidence.

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Lurking Variable

A variable that is not your explanatory (x) or response (y) variable, but has an influence on the relationship between them (a lurking variable is an outside factor that is causing both variables to change).

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There is a strong positive correlation between shoe size and scores on a spelling test in elementary school.

lurking variable: age
(older kids, in general, have bigger feet & would do on a spelling test)

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Causation

When there are no lurking variables involved and the explanatory (x) is causing a relationship with the response variable (y).

Ex. There is a strong positive correlation between the number of beers a person drinks and their blood alcohol content (BAC).

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Ex. 1: There is a strong positive correlation between the number of churches and the number of murders in Detroit, MI. Therefore, churches cause murders.

lurking variable: population
(the more people the more churches + the more crime)

Ex. 2: There is a strong positive correlation between the number of firefighters at a fire and the damage caused at the scene of the fire. Therefore, firefighters are causing lots of damage.

lurking variable: size of the fire

Ex. 3: There is a strong positive correlation between smoking and lung cancer. Therefore, smoking causes lung cancer.

causation

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Ex. 4: There is a strong positive correlation between mothers taking certain depression medications and birth defects in their children. Therefore, those medications are causing birth defects.

causation

Ex. 5: There is a strong positive correlation between the amount of artificial sweetener (saccharin) in a rat's diet and the number of tumors in their bladder. Therefore, artificial sweetener is causing tumors in the bladder.

causation

Ex. 6: There is a high correlation between the number of ice cream cones eaten and the number of drowning deaths. Therefore, eating ice cream causes someone to drown.

lurking variable: season (summer)
in the summer, more people eat ice cream + go swimming

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Section 6.2

#1-3, 5-13

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Oct 12-9:22 PM