

Correlation is when two variables have a relationship with each other. For example, the number of years you have been working at a company might have positive linear correlation with the salary you are paid (remember the example from yesterday?).

Causation is when one variable directly causes the other variable. For example, if you work more hours in the week, you will get paid more that week. Working more **causes** a higher pay.

1. Look at the cartoon at the right. What causation is being implied? Is this reasonable? What other factors might explain the correlation observed? *red light causes bump*

THE FAMILY CIRCUS



"I wish they didn't turn on that seatbelt sign so much! Every time they do, it gets bumpy."

Look back over the examples we have had over the past two days. Each example had a correlation. State the correlation between the two variables. Determine if you think there is a causation relationship between the variables. If so, explain why. If not, give some other factors that might cause the correlation.

2. The ages and height of the tallest man.

$$y = 2.5x + 52$$

Correlation: *0.99, yes*

Causation *yes*

Why or why not? *Growth hormone*

Age in Years	Height in Inches
5	64
8	72
9	74.5
10	77
11	79
12	82.5
13	85.75
14	89
15	92
16	94.5
17	96.5
18	99.5
19	101.5
20	102.75
21	104.25
22	105.5
22.4	107.1

3. The years I have been saving, and how much money I have.

Correlation: *0.99, yes* $y = 788x + 4481$

Causation. *no, (or yes)*

Why or why not? *not one to one*

-however, if you pull out the same each year then yes

Years	\$ Saved
0	5000
1	5500
2	6050
3	6660
4	7320
5	8050
6	8860
7	9740
8	10720
9	11790
10	12970

4. Number of years worked and annual salary (in thousands of dollars).

Years	0.5	1	1	1.5	2	2	3	4	4.5	9	9.5	15
Salary (thousands of \$)	55	63	64	62	64	68	70	74	74	80	85	90

Correlation: 0.95, yes

Causation?: Yes!

Why or why not? more, you work for a company annual salary increase.

5. The number of days until Christmas and how many people got to the ER that day.

Correlation:

Causation?:

Why or why not?

Day Until Christmas	# of People in ER
5	8
7	9
10	7
12	5
15	2
2	13
0	20
6	10