

STA 674

Regression Analysis And Design Of Experiments
Measuring Association between Two Variables – Lecture 2

STA 674, RADOE:

Measuring Association between Two Variables

- What is it?
 - Regression

STA 674: Measuring Association between Two Variables

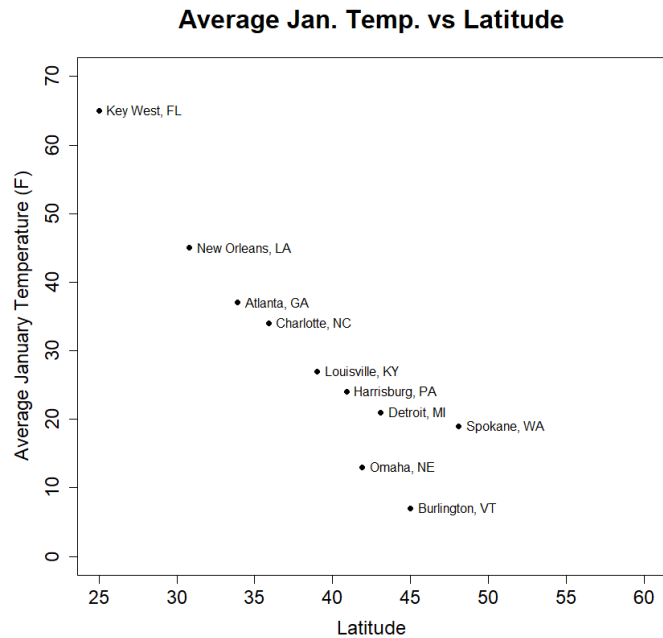
Regression

City		Latitude	Average Jan Temp
Louisville,	KY	39	27
Key West,	FL	25	65
New Orleans,	LA	30.8	45
Atlanta,	GA	33.9	37
Charlotte,	NC	35.9	34
Harrisburg,	PA	40.9	24
Omaha,	NE	41.9	13
Detroit,	MI	43.1	21
Burlington,	VT	45	7
Spokane,	WA	48.1	19

STA 674: Measuring Association between Two Variables

Regression

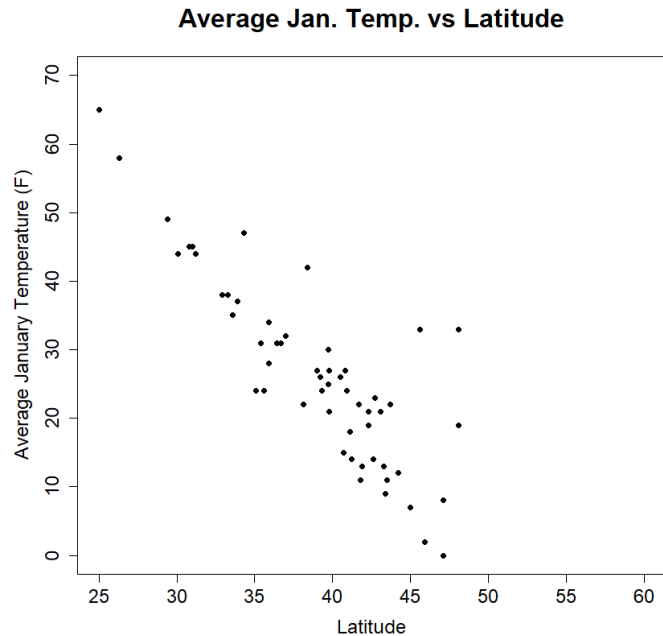
City		Latitude	Average Jan Temp
Louisville,	KY	39	27
Key West,	FL	25	65
New Orleans,	LA	30.8	45
Atlanta,	GA	33.9	37
Charlotte,	NC	35.9	34
Harrisburg,	PA	40.9	24
Omaha,	NE	41.9	13
Detroit,	MI	43.1	21
Burlington,	VT	45	7
Spokane,	WA	48.1	19



STA 674: Measuring Association between Two Variables

Regression

City		Latitude	Average Jan Temp
Louisville,	KY	39	27
Key West,	FL	25	65
New Orleans,	LA	30.8	45
Atlanta,	GA	33.9	37
Charlotte,	NC	35.9	34
Harrisburg,	PA	40.9	24
Omaha,	NE	41.9	13
Detroit,	MI	43.1	21
Burlington,	VT	45	7
Spokane,	WA	48.1	19



STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?
2. Would the results change if we had chosen different cities?
3. Does temperature really vary by latitude or did this pattern occur by chance?
4. Can we predict temperature at new cities?
5. Are there other factors that better predict temperature either by themselves or in combination with latitude?
6. Are there cities that don't fit the pattern? What should we do with them?

STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?

Answer: as latitude increases, temperature decreases.


STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?

Answer: as latitude increases, temperature decreases.

Better: this , and: the relationship seems linear (meaning—the change in y , regardless of what x you choose, is the same.) Finally, it is a somewhat strong relationship—we would feel confident predicting an average January temperature if someone gave us a new city's latitude—but there are a couple of cities that don't fall close to the line suggested by the rest.

STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?
2. Would the results change if we had chosen different cities?

Answer: Yes and No.

What do I mean, yes and no!! I mean—exact points on the plot would change, but our “statistical instincts” tell us that our conclusions on the previous slide would likely remain the same.

STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?
2. Would the results change if we had chosen different cities?
3. Does temperature really vary by latitude or did this pattern occur by chance?

Answer: Temperature really varies by latitude.

Probably.

STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?
2. Would the results change if we had chosen different cities?
3. Does temperature really vary by latitude or did this pattern occur by chance?
4. Can we predict temperature at new cities?

Answer: Yes and no.

STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?
2. Would the results change if we had chosen different cities?
3. Does temperature really vary by latitude or did this pattern occur by chance?
4. Can we predict temperature at new cities?
5. Are there other factors that better predict temperature either by themselves or in combination with latitude?

Answer: Better? Maybe, maybe not. But do other factors contribute—of course.

STA 674: Measuring Association between Two Variables

Regression

Questions to consider:

1. How does temperature vary with latitude?
2. Would the results change if we had chosen different cities?
3. Does temperature really vary by latitude or did this pattern occur by chance?
4. Can we predict temperature at new cities?
5. Are there other factors that better predict temperature either by themselves or in combination with latitude?
6. Are there cities that don't fit the pattern? What should we do with them?

Answer: Yes, and there always will be. What we do depends on the setting.