SOCI 1230: DSAD

Introducing Association and Correlation

January 19, 2022

Some Foundations

A hypothesis is a suggestion (ideally supported by theory) about how variables *tend to move together*

- How close or tight are the values? How well do they resemble a straight line?
- The spread they tend to share = covariance
- The change they tend to share = correlation

Interpreting Correlations

Easier to interpret correlations than covariances

- Always bounded by -1, 1
- Association is linear (for now)
- Positive correlation > 0
    - When X is larger than its mean, likely that Y is larger than its mean
- Negative correlation < 0
    - When X is larger than its mean, unlikely that Y is larger than its mean

Interpreting Correlations

Correlation of X, Y = Correlation of Y, X

- But still think of axes

Not affected by changes in scale

- Can multiply all the values by a constant and the correlation is still the same
- Temperature degrees, currencies, etc.

But can be affected by outliers

Association Has Sign And Strength

Positive correlation coefficients look like proportions but they are not

Strong association: knowing a value of one variable helps predict a value of the other variable

Weak association: too much variability to use the value of one variable to make a good guess about the value of the other variable

Remember: Not causal!

Keep in mind: *strong* is not always *better*

Strength of Associations

No association = 0 to .19 or 0 to -.19

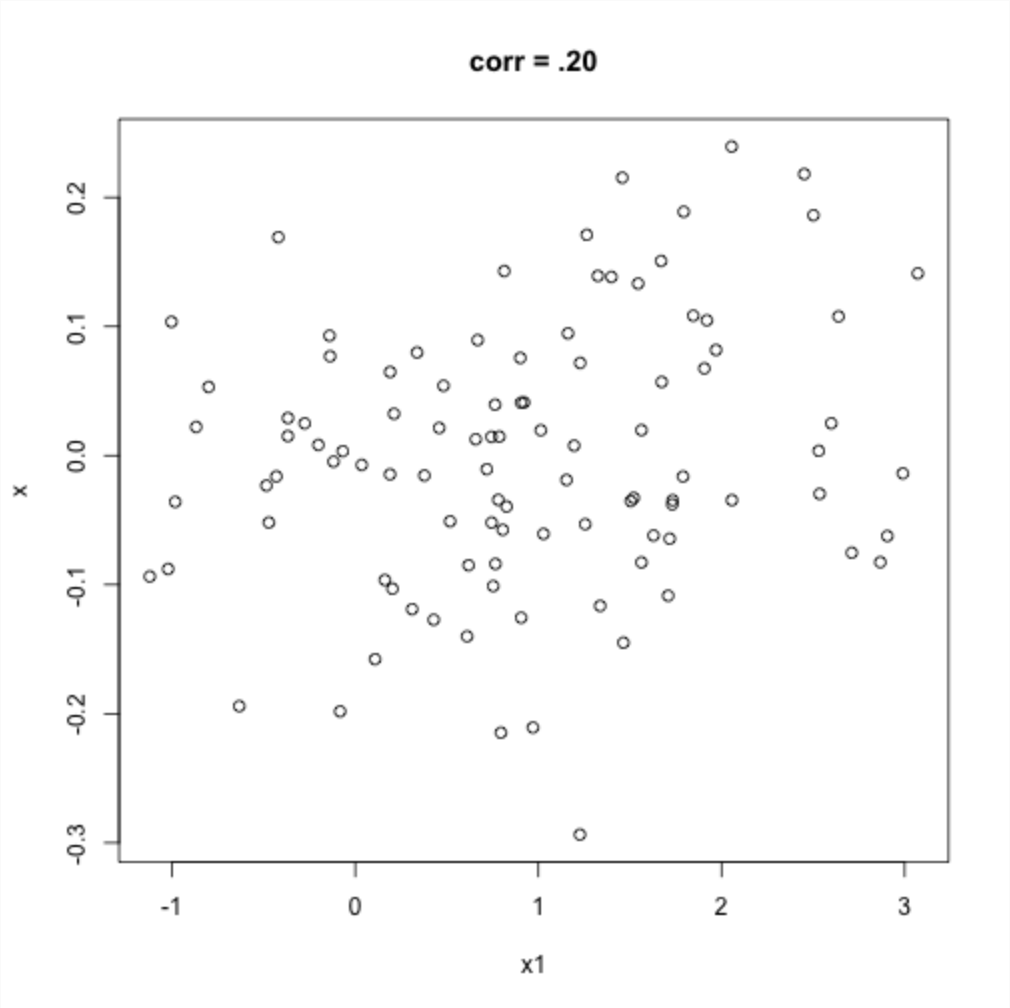
Weak association = .20 to .29 or -.20 to -.29

Moderate association = .30 to .49 or -.30 to -.49

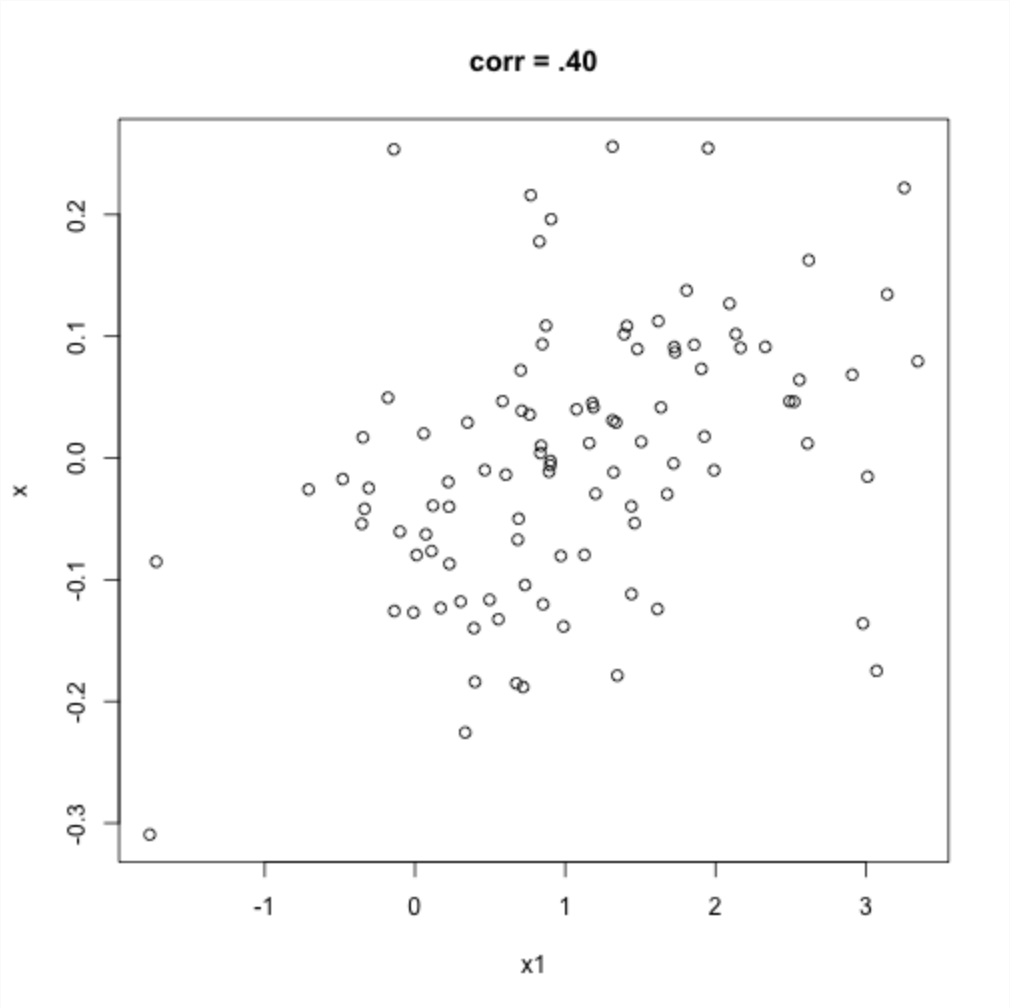
Strong association = .50 to .69 or -.50 to -.69

Very strong association = greater than .70 or less than -.70

Scatterplots



Scatterplots



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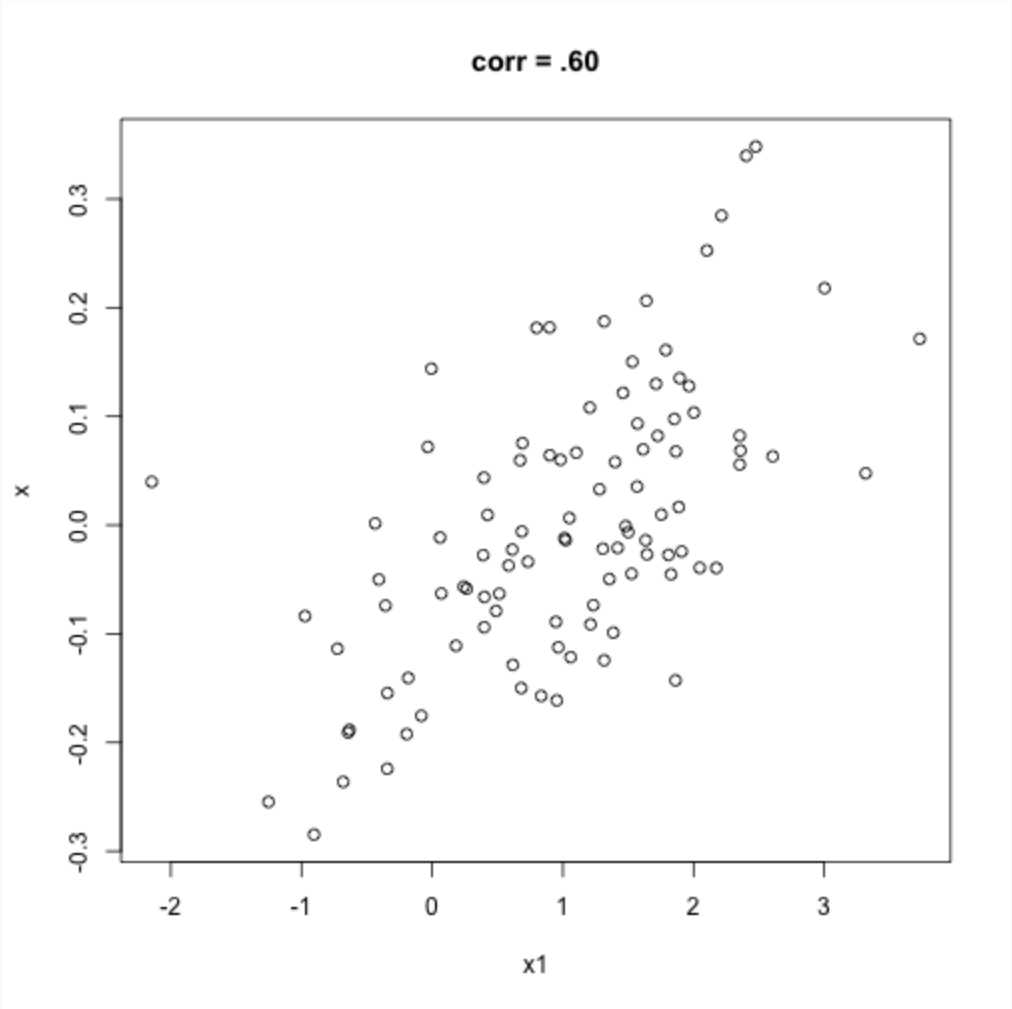

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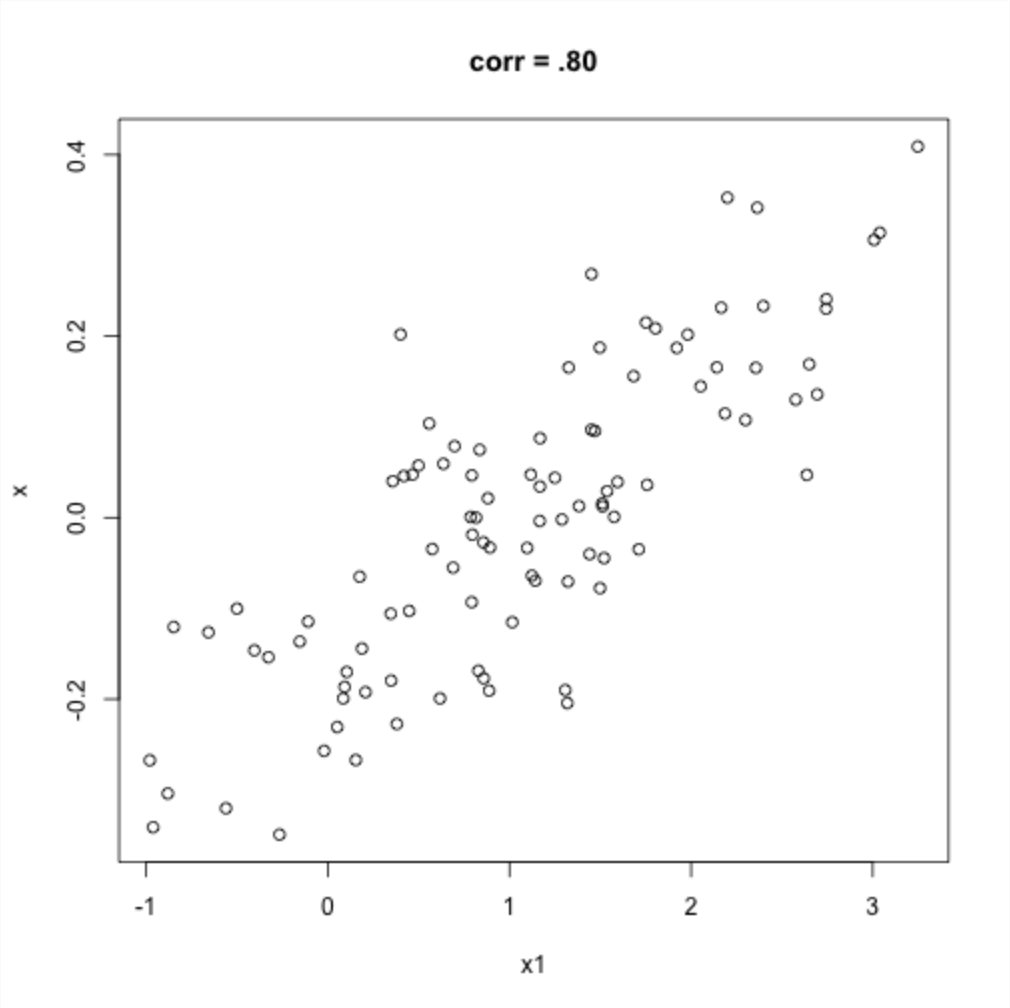

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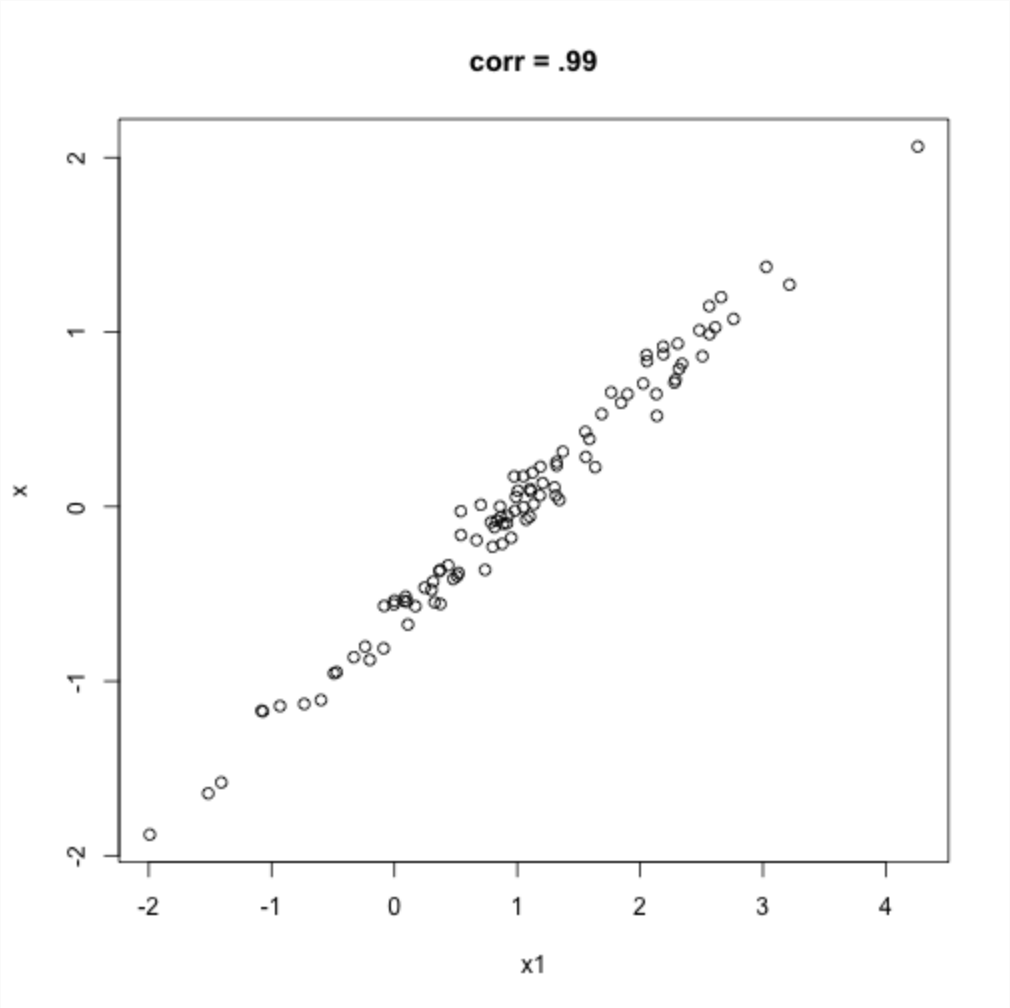

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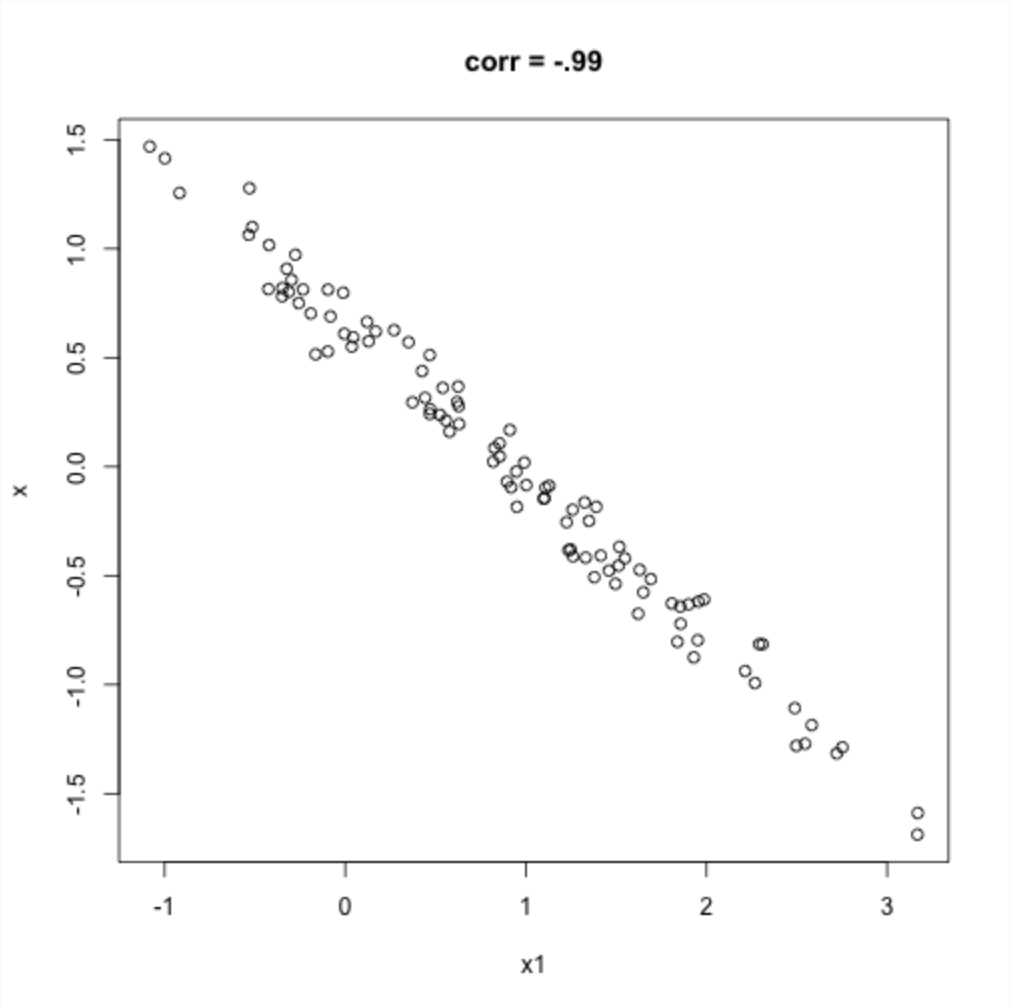

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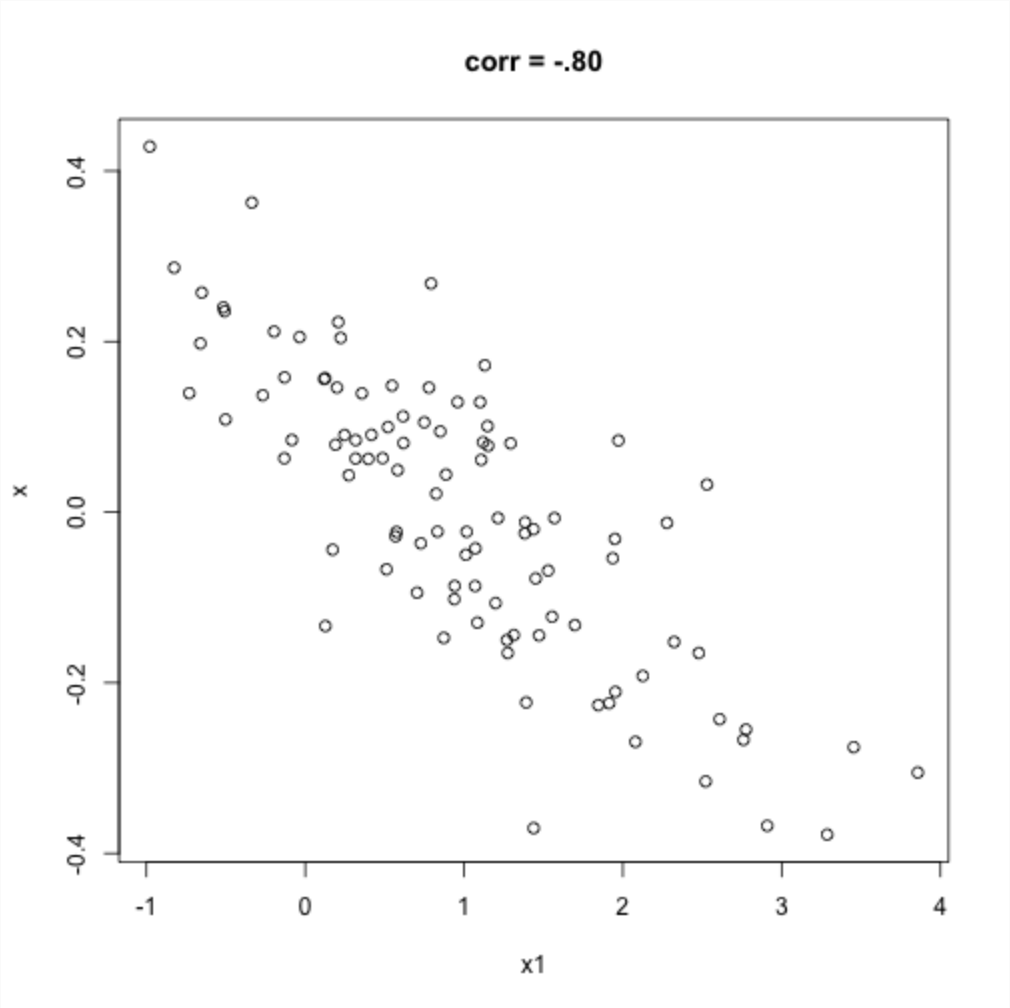

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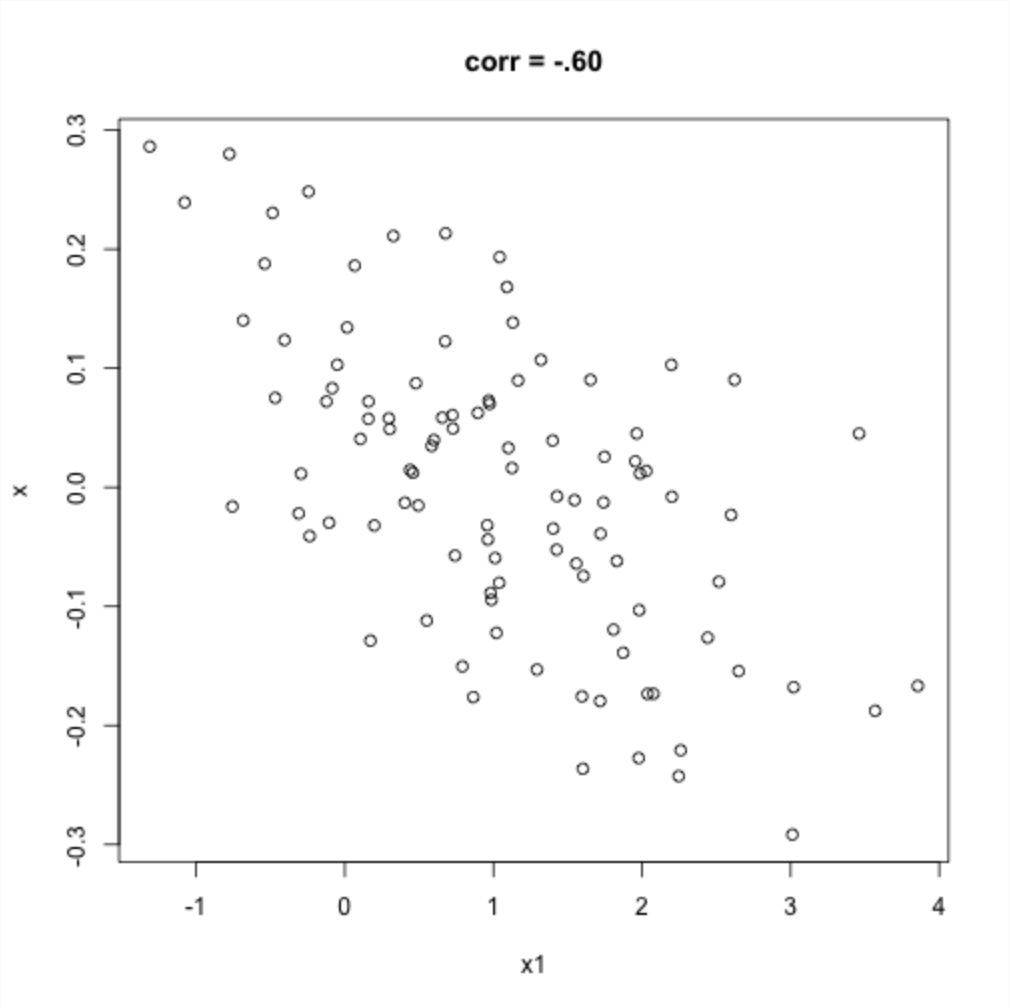

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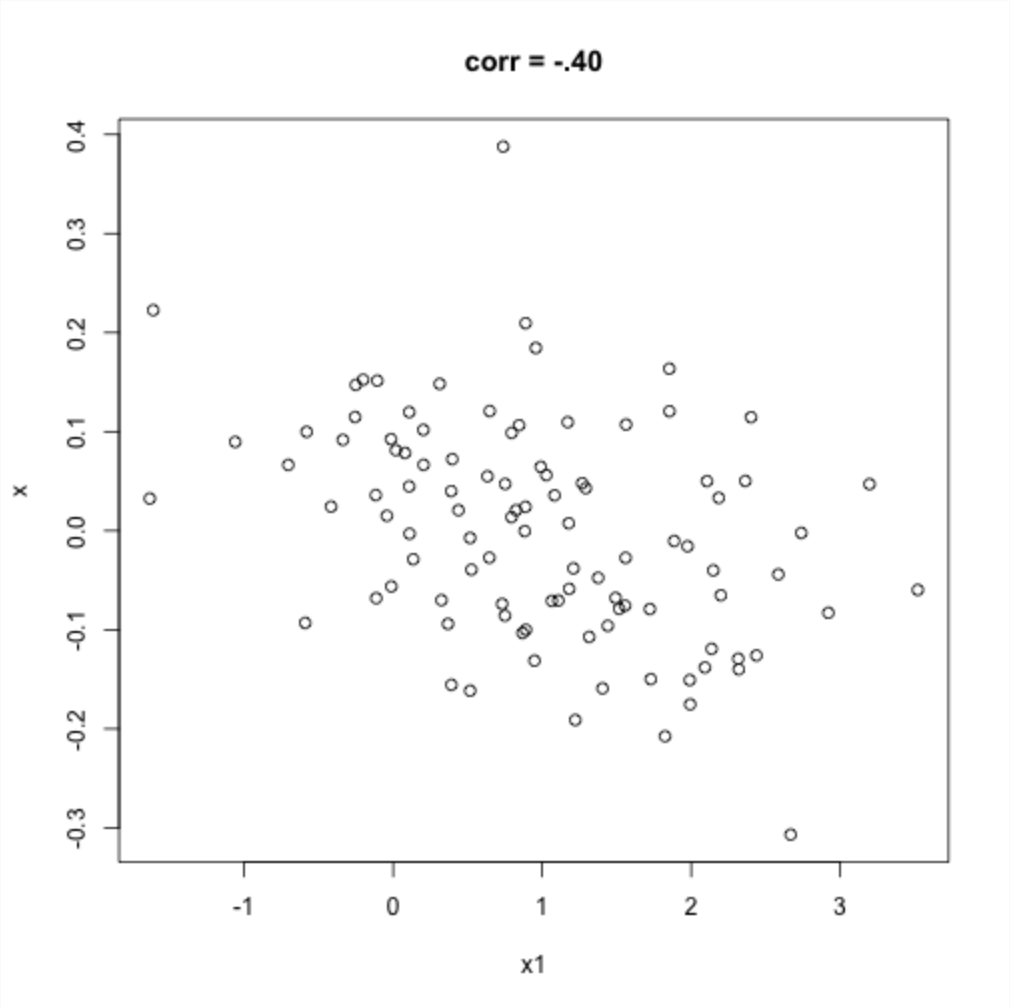

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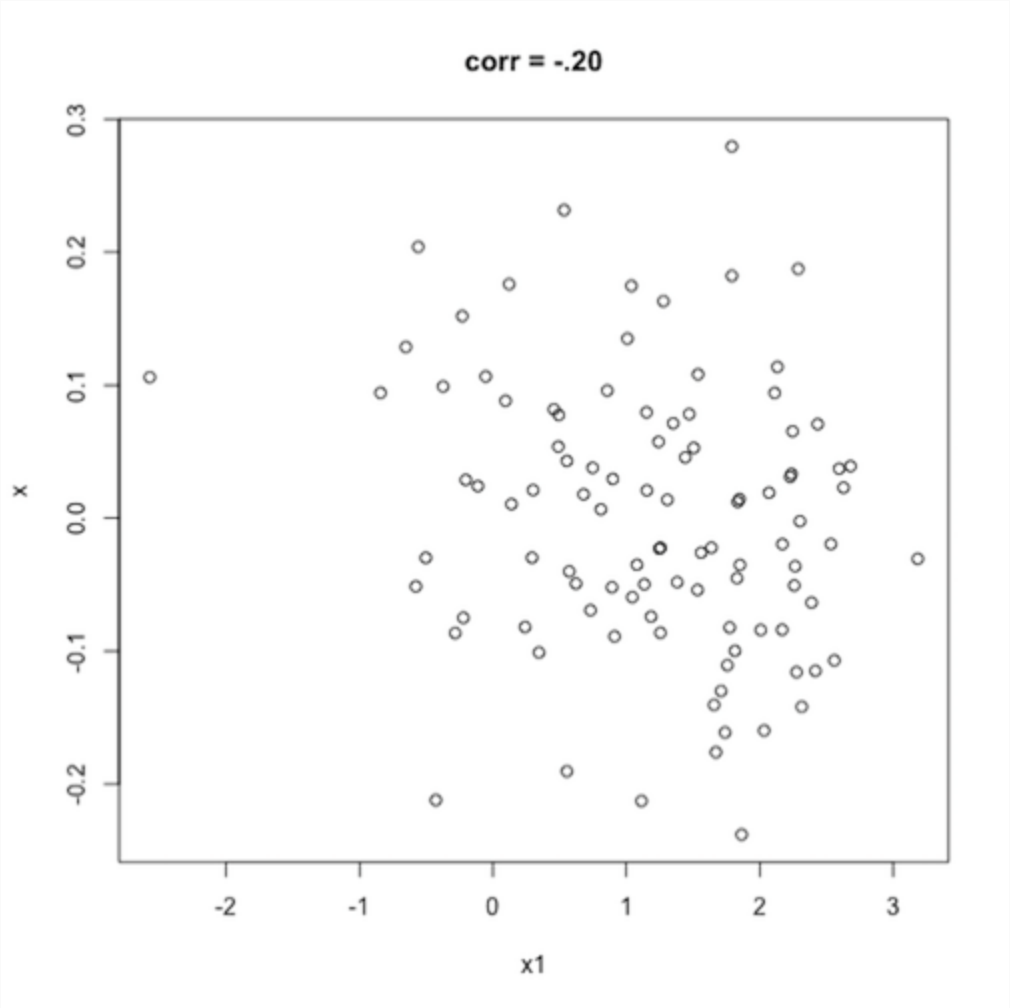
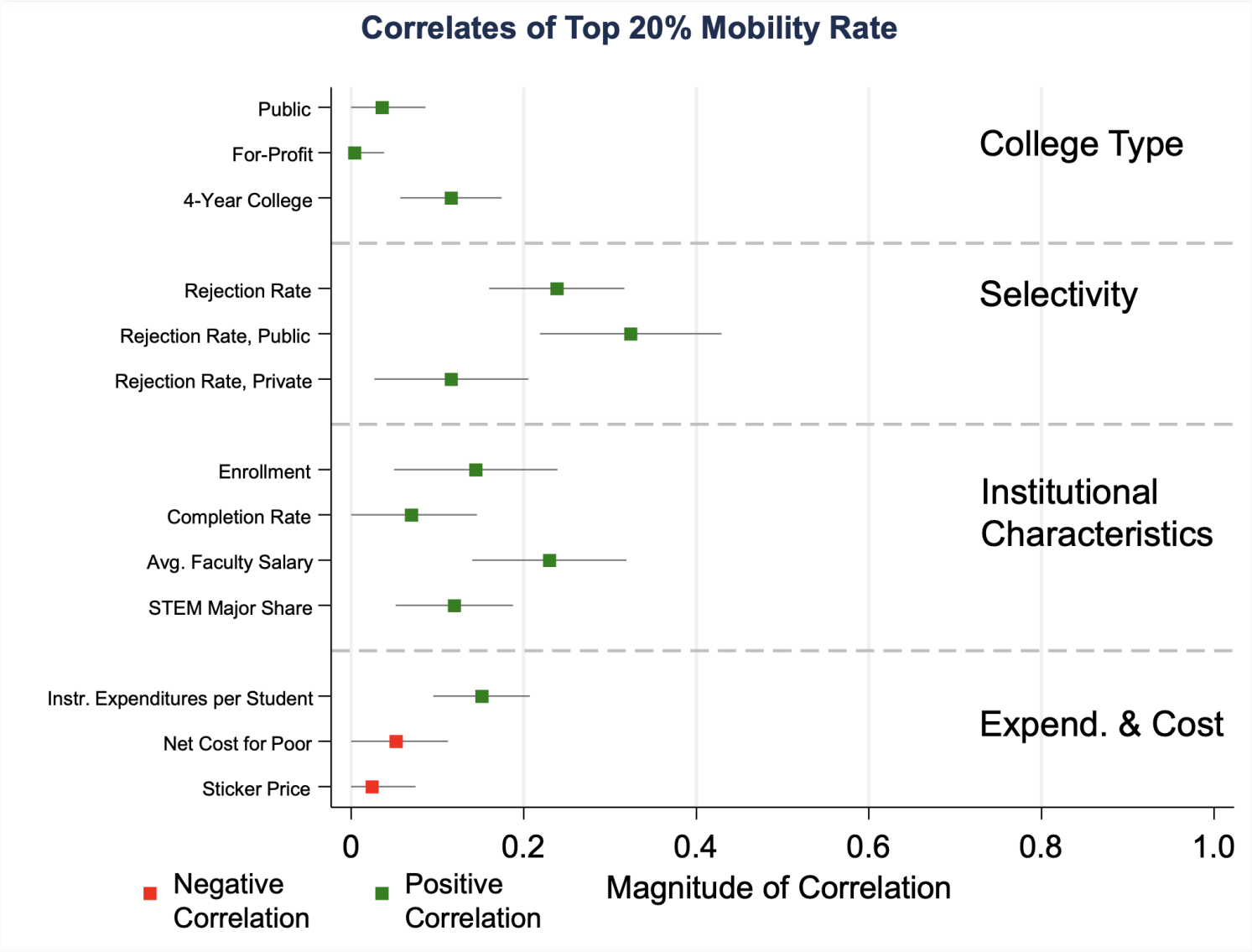


Chetty et al's Correlations



Chetty et al's Correlations