Correlation

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Correlation

Definition:

A mutual relationship or connection between two variables. A strong correlations indicates a strong relationship.

Types of correlation:

Positive: both variables increase or decrease simultaneously

Negative: while one variable increases, the other decrease.

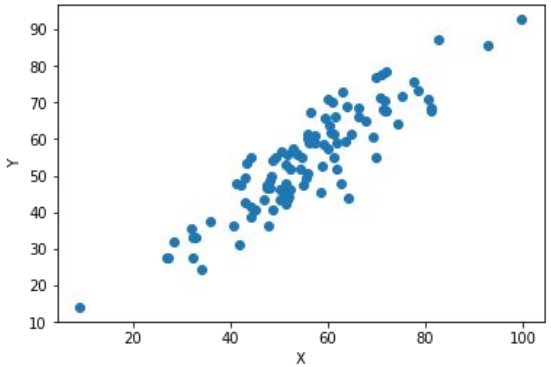
Example:

As the temperature goes up, ice cream sales also go up. Therefore, we could say there is a correlation between both variables. In addition, it is positive as both follow the same trend.

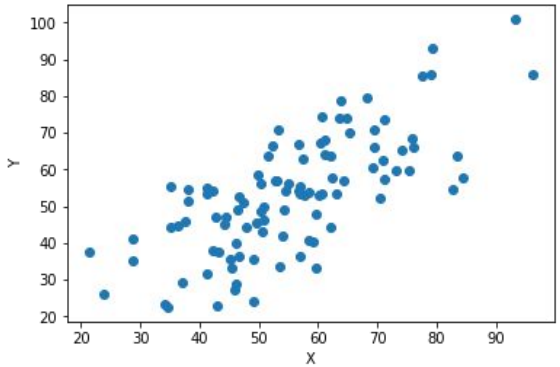
Positive correlation

A **positive** correlation indicates the extent to which those variables increase or decrease together.

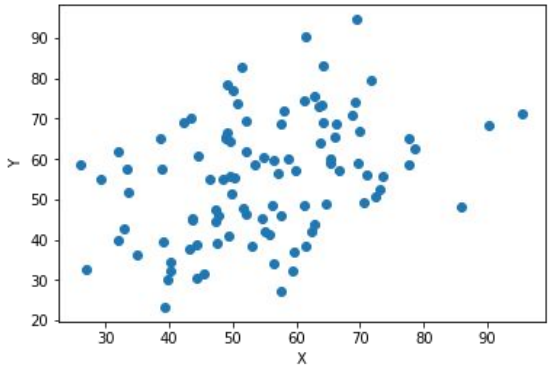
Strong



Weak



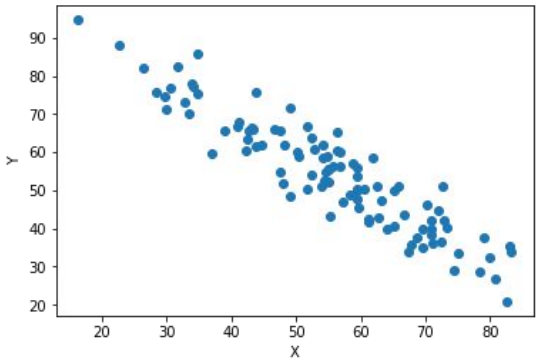
No correlation



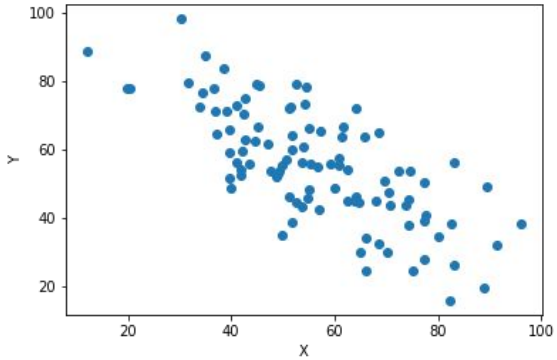
Negative correlation

A **negative** correlation indicates the extent to which one variable increases as the other decreases.

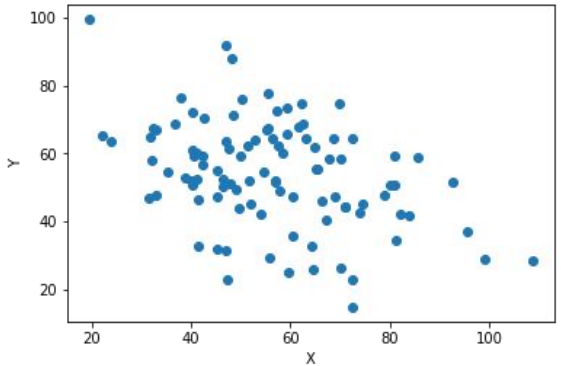
Strong



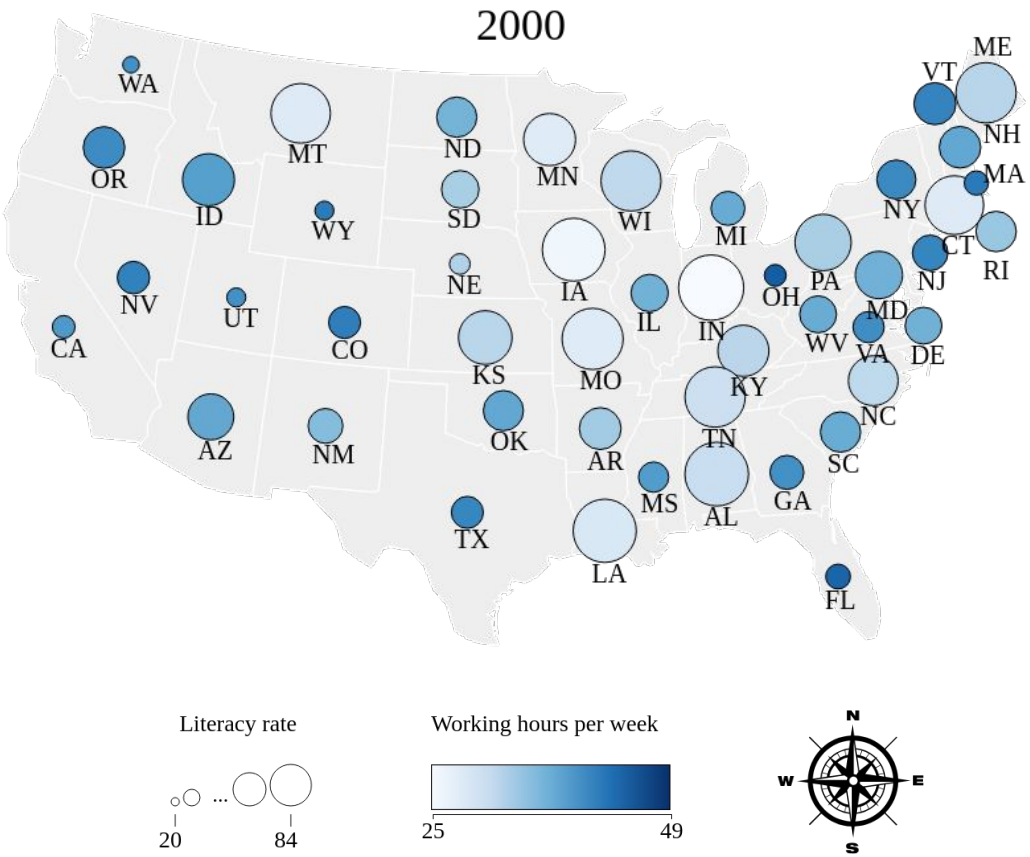
Weak



No correlation



Symbol map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Literacy rate
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Symbol map


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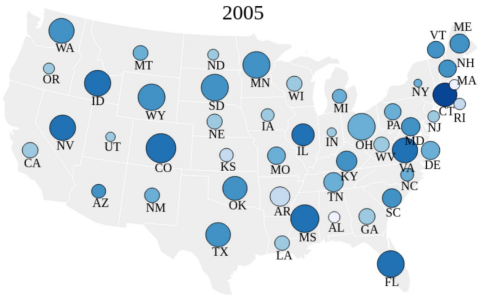
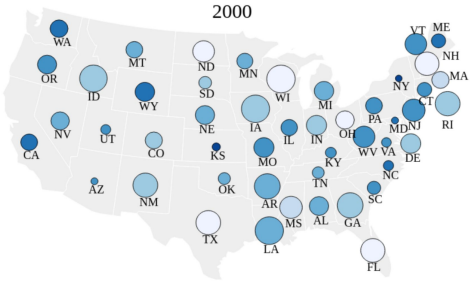
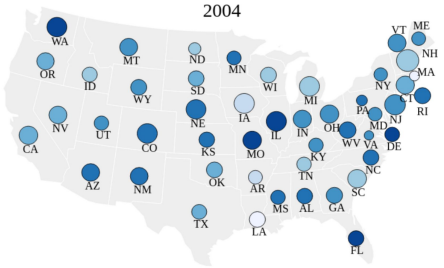
Correlation on a Symbol map



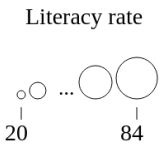


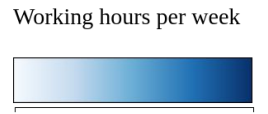


Positive:
Small circles are lighter;
big circles are darker

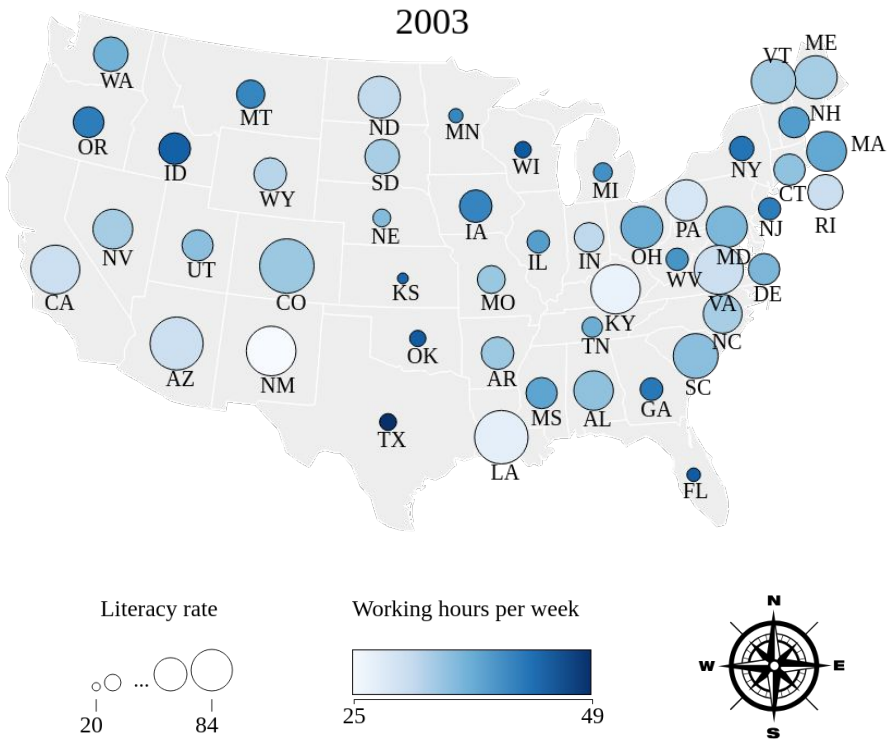
Negative:
Small circles are darker;
big circles are lighter

No correlation:
The color and size of circles are not related





Example 1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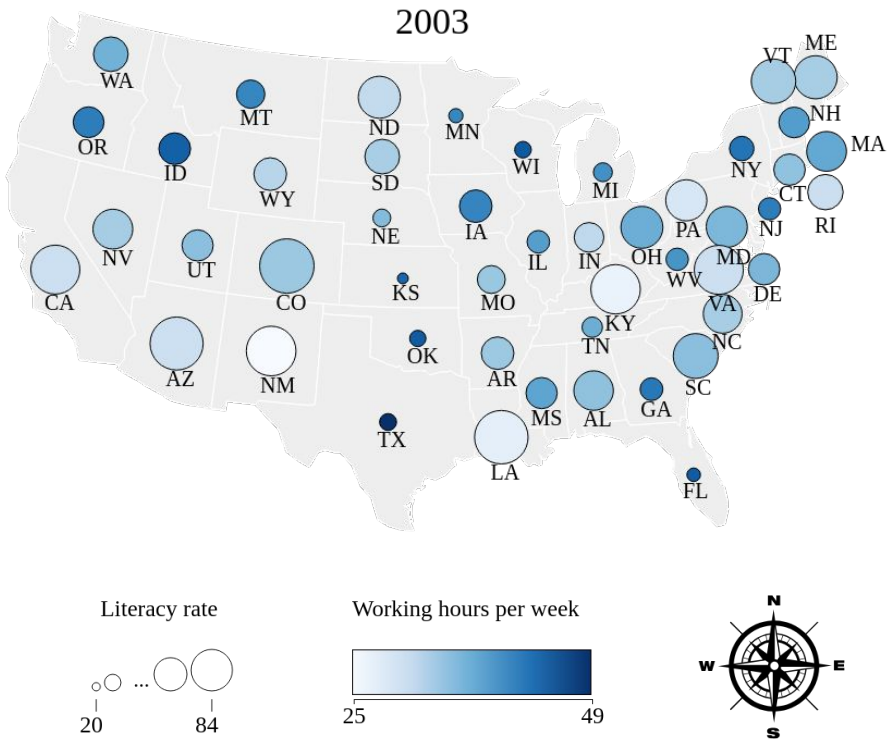
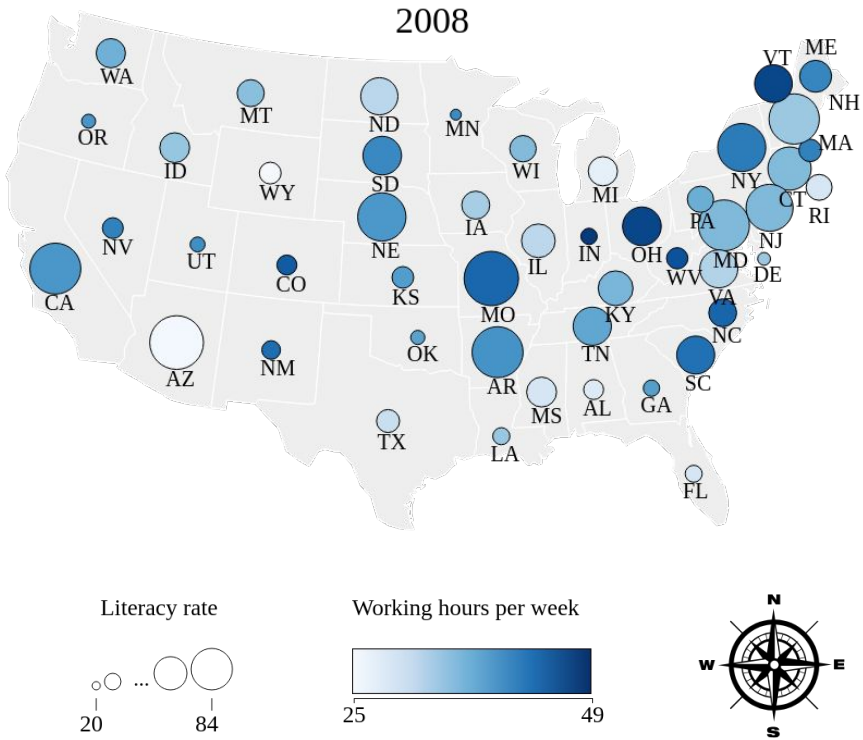
Example 1



Answer: <u>Negative</u>

Small circles are darker;
big circles are lighter

Example 2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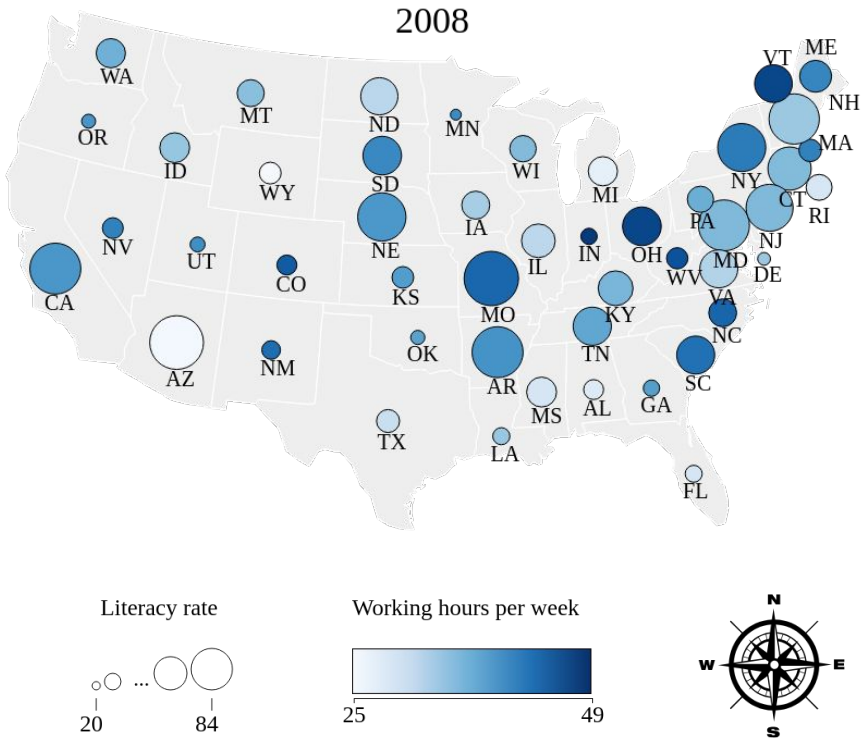
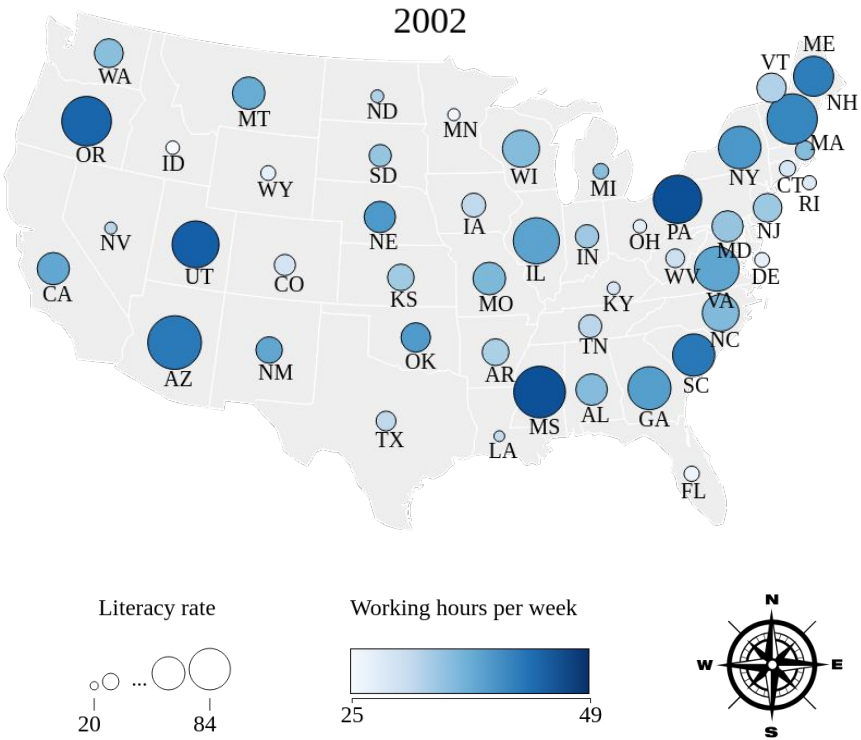
Example 2



Answer: <u>No correlation</u>

The color and size of circles are not related

Example 3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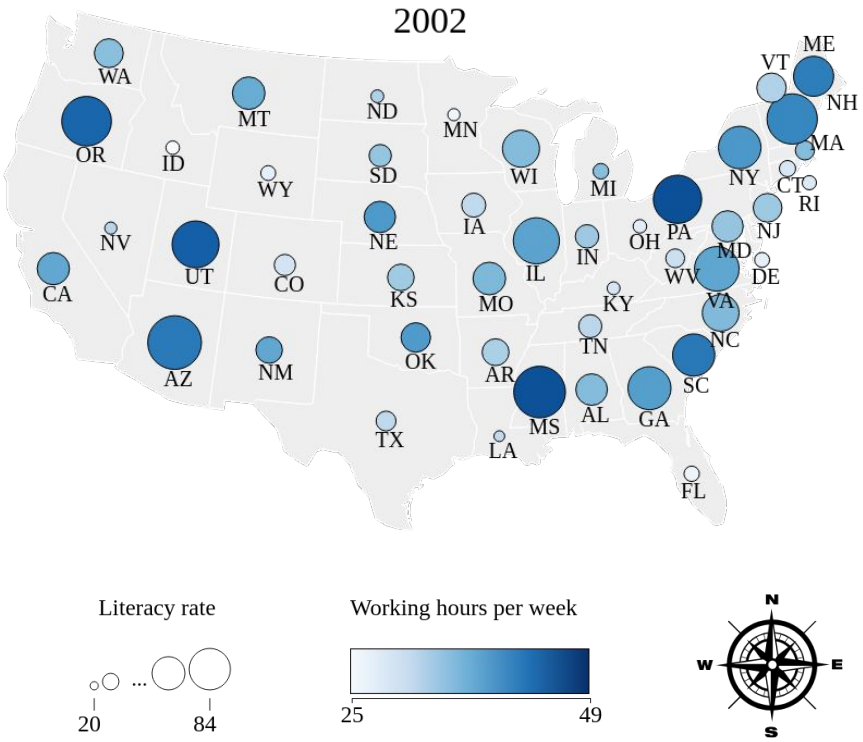
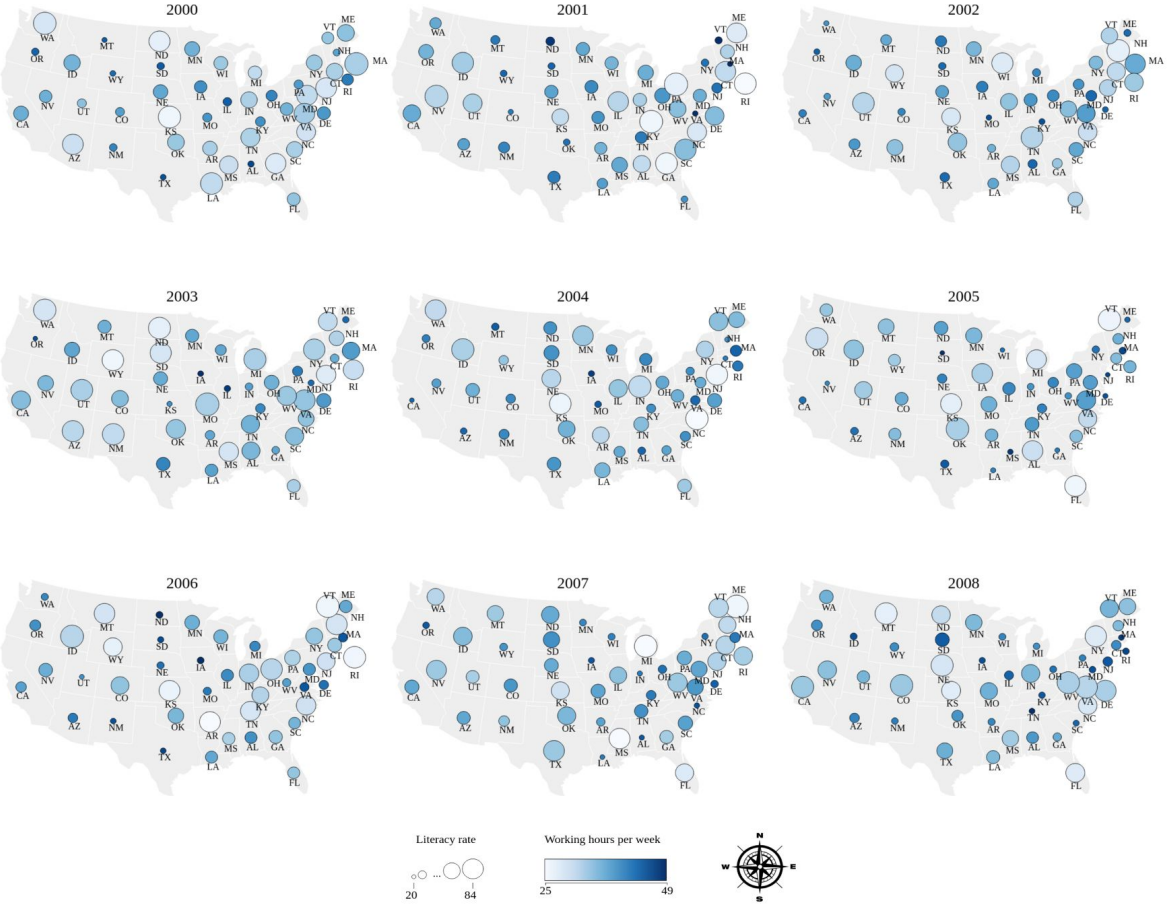
Example 3



Answer: <u>Positive</u>

Small circles are lighter;
big circles are darker

Example 4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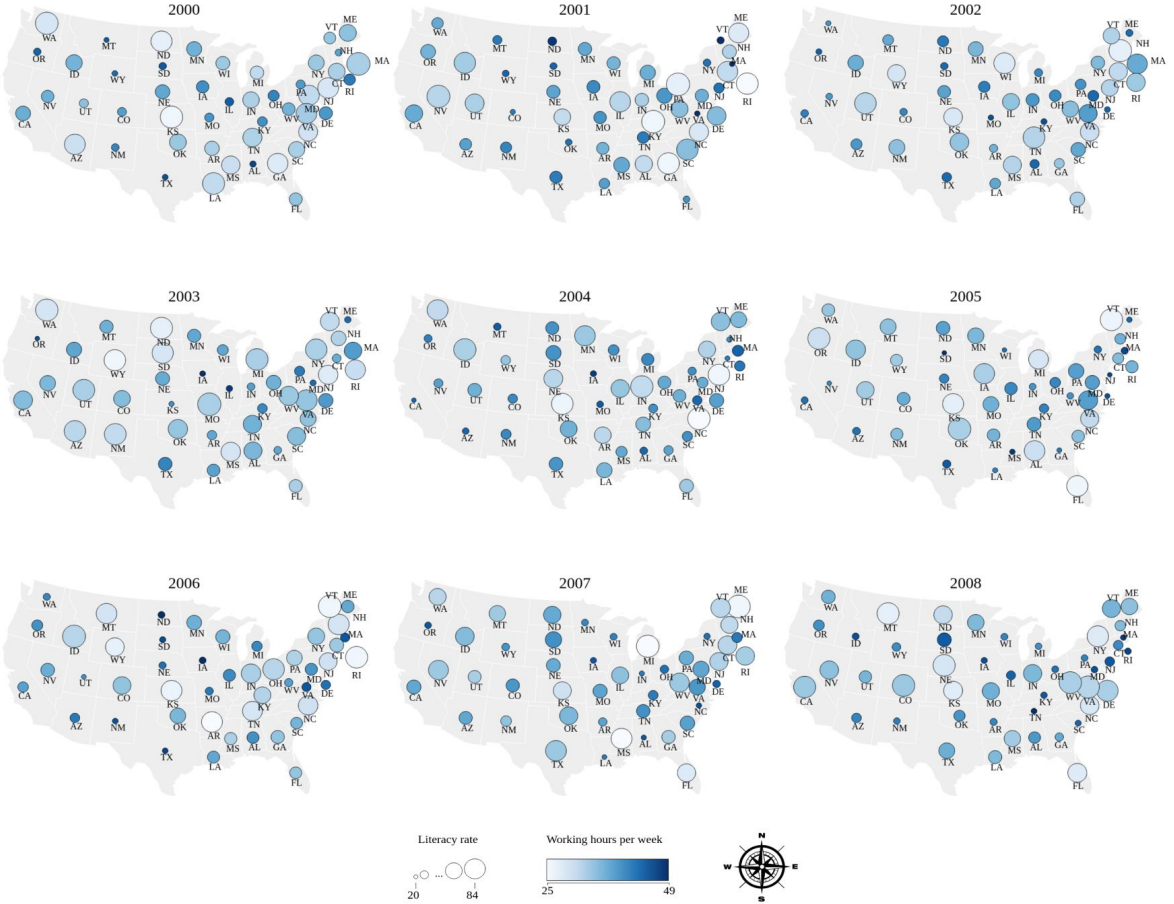
Example 4

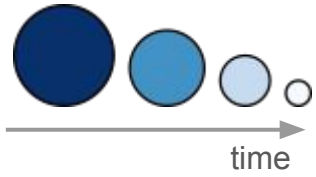
Answer: negative

Small circles are darker;
big circles are lighter

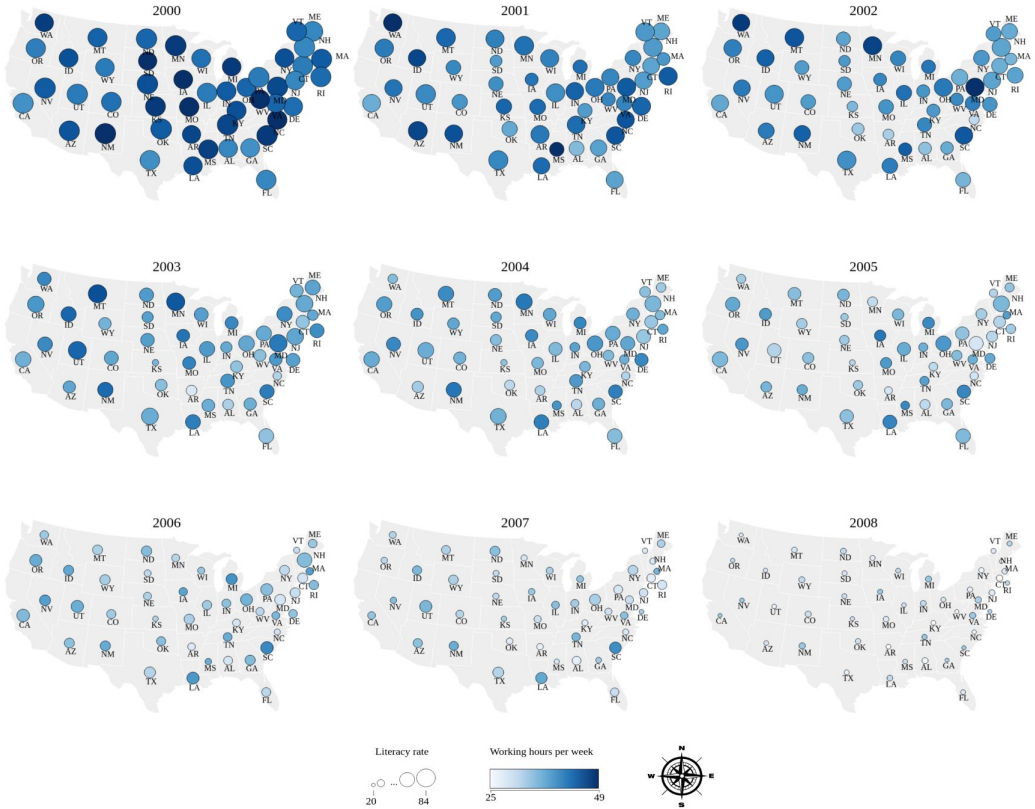


Monotonic evolution for symbol map

When time is considered, variables can change with **monotonic** evolution: over time they steadily decrease or increase.

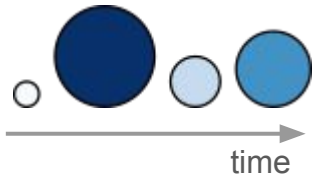


Positive correlation with monotonic evolution

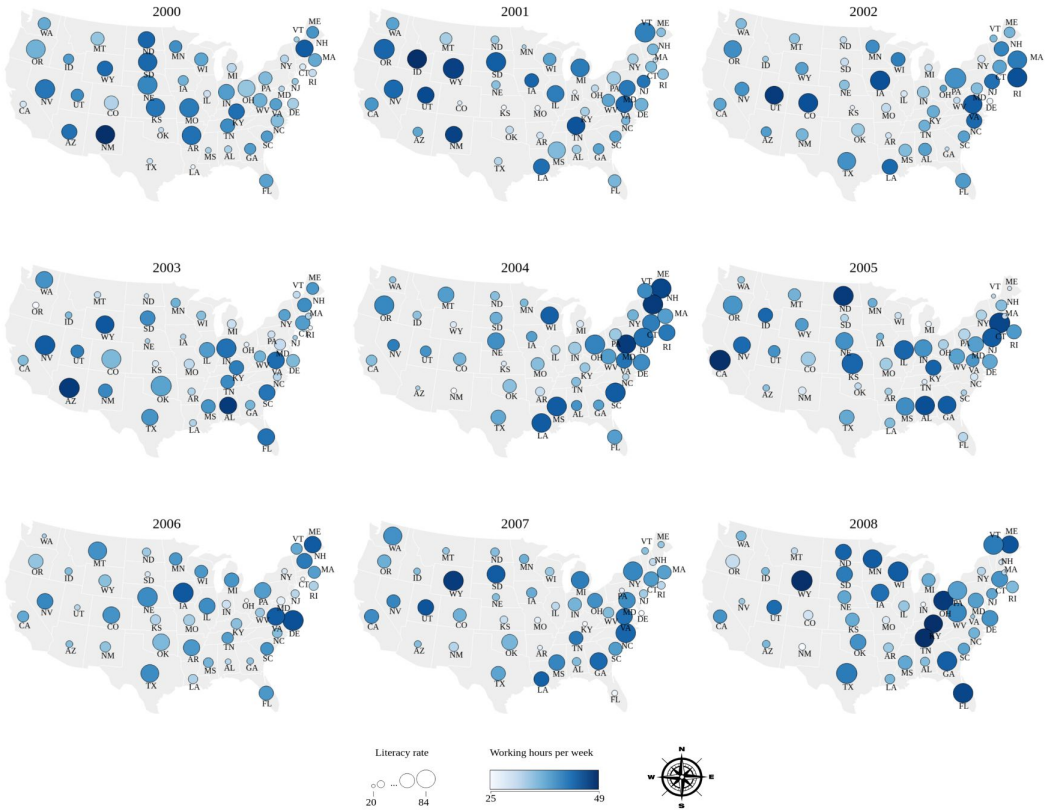


Non monotonic evolution for symbol map

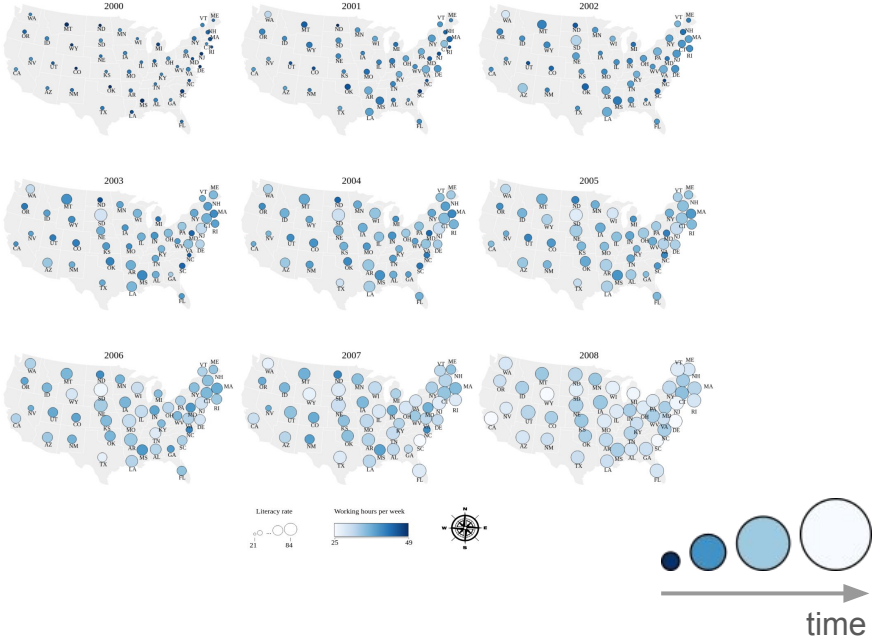
Variables can also evolve over time **without having a monotonic evolution** but still having a correlation.



Positive correlation without monotonic evolution

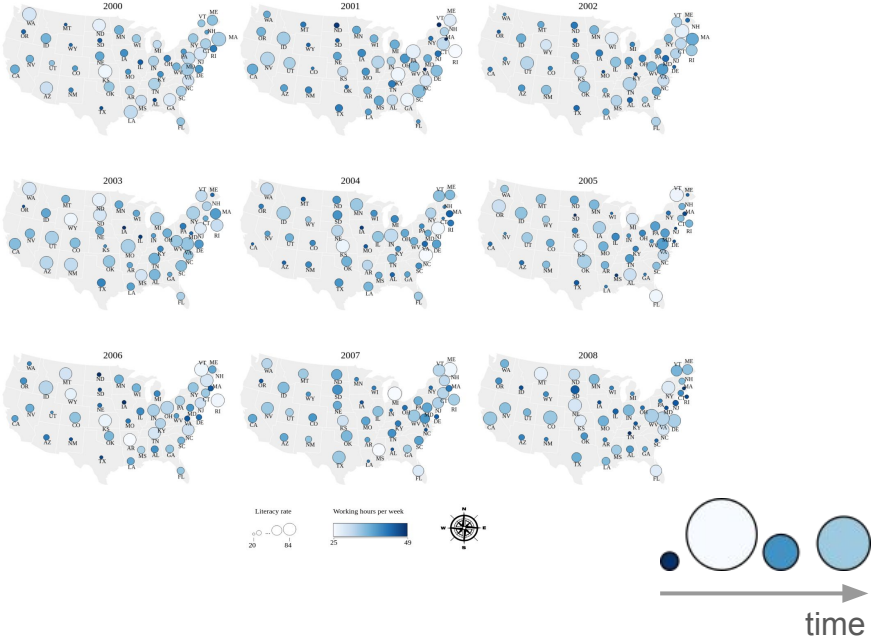


Negative correlation **with** monotonic evolution



- **Darker** dots are **smaller** and the **lighter** ones are **bigger** (negative correlation).
- Both variables (size/color) have **a clear growth trend** (in this case size goes up and color goes down).

Negative correlation **without** monotonic evolution



- **Darker** dots are **smaller** and the **lighter** ones are **bigger** (negative correlation).
- Both variables (size/color) **do not present a clear trend**.