

# Correlation

Vanessa Pena-Araya

Anastasia Bezerianos

Emmanuel Pietriga

# 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.

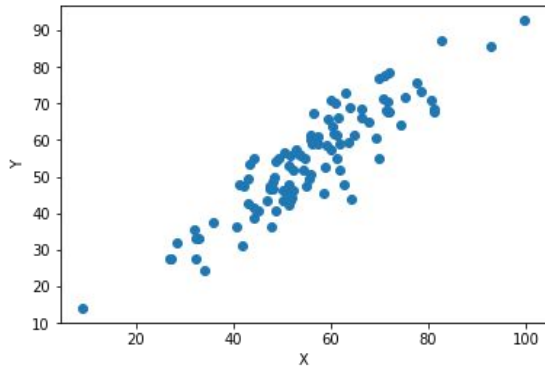
## Example:

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.

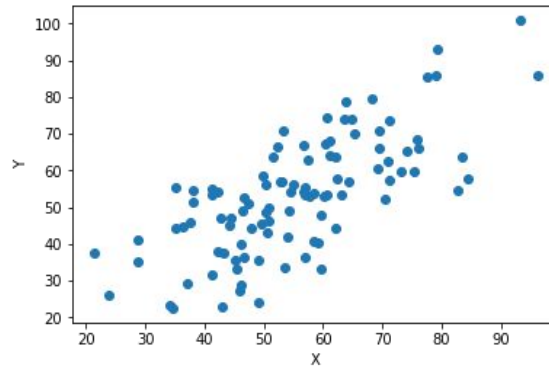
# Positive correlation

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

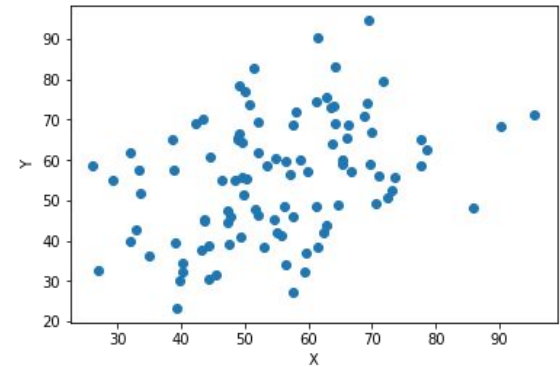
Strong



Weak



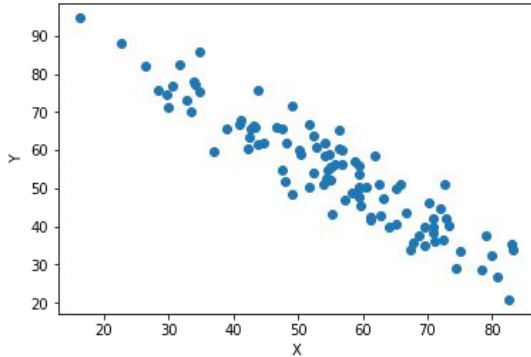
No correlation



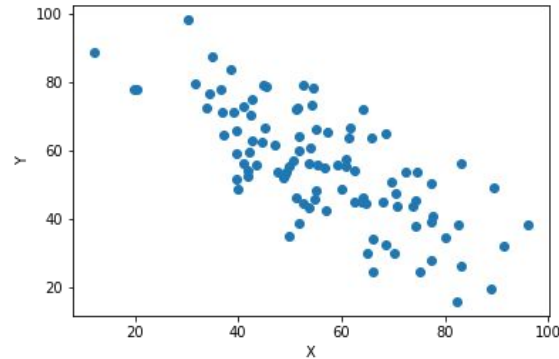
# Negative correlation

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

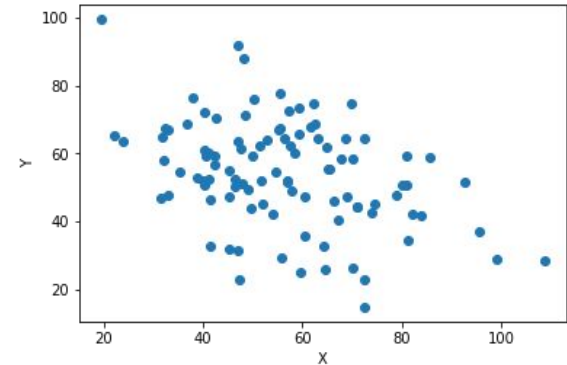
Strong



Weak

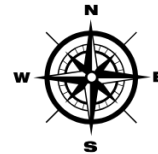
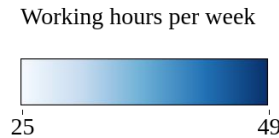
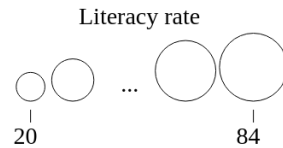
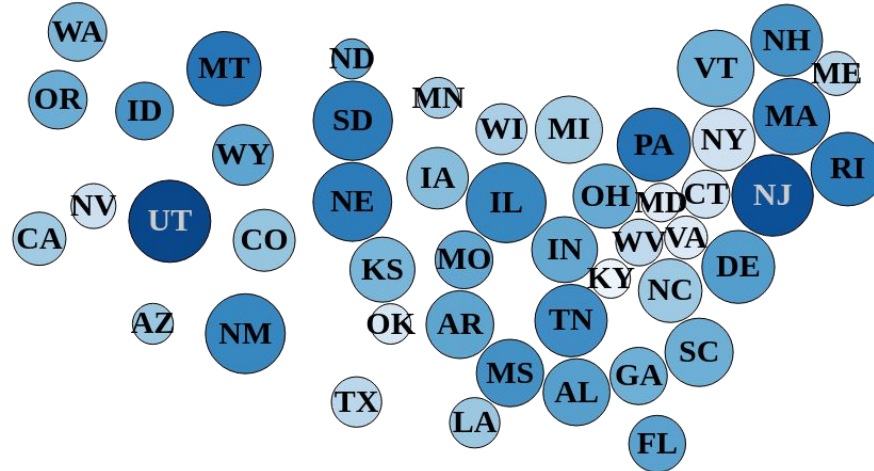


No correlation



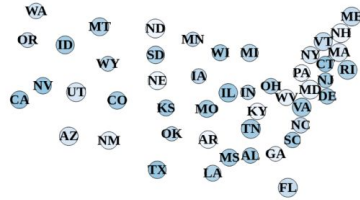
# Dorling cartogram

2000

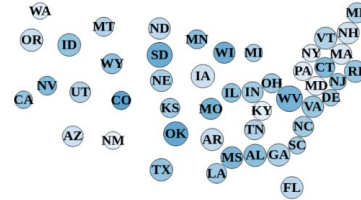


# Dorling cartogram

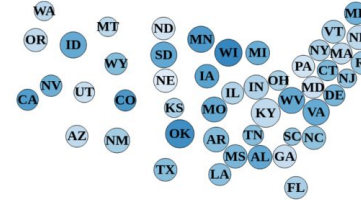
2000



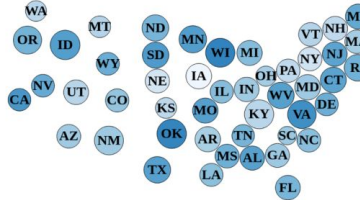
2001



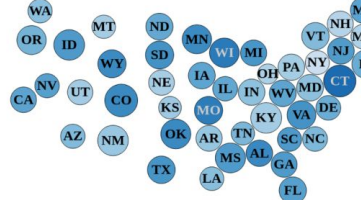
2002



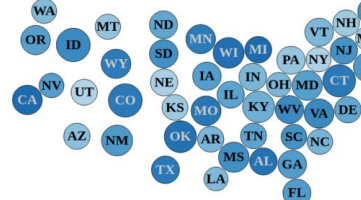
2003



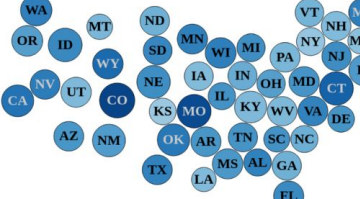
2004



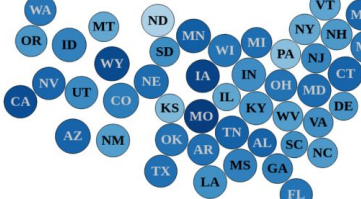
2005



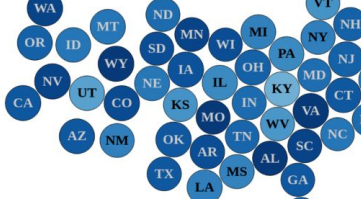
2006



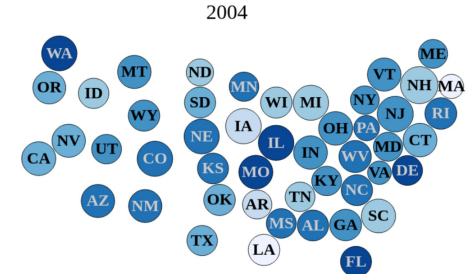
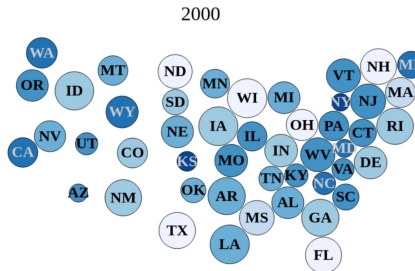
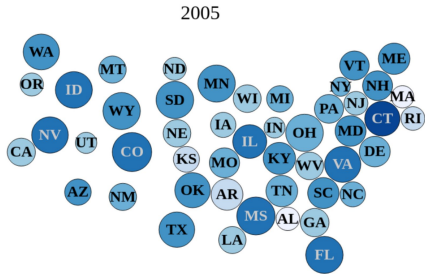
2007



2008



# Correlation on a Dorling cartogram



## Positive:

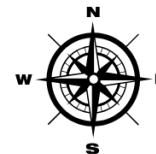
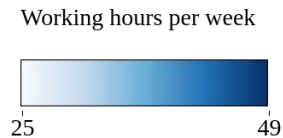
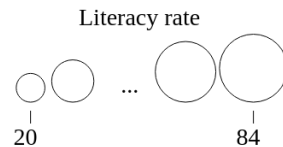
Small circles are lighter;  
big circles are darker

## Negative:

Small circles are darker;  
big circles are lighter

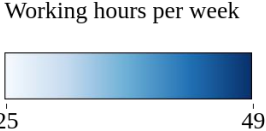
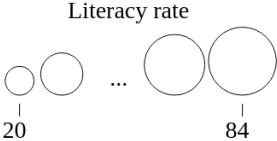
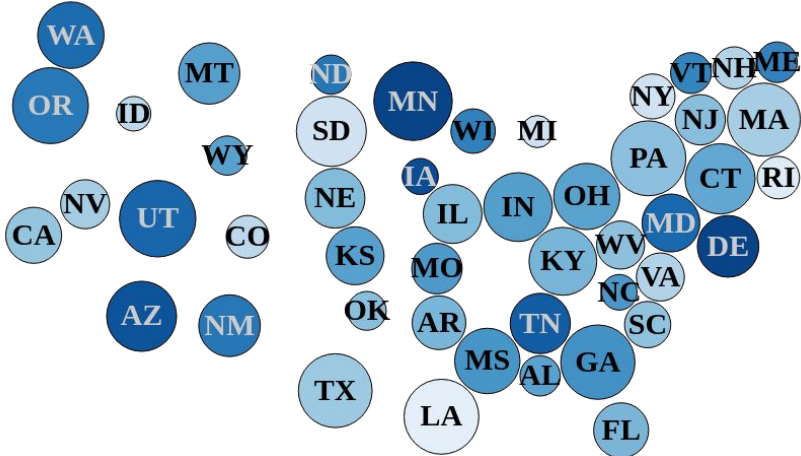
## No correlation:

The color and size of circles  
are not related



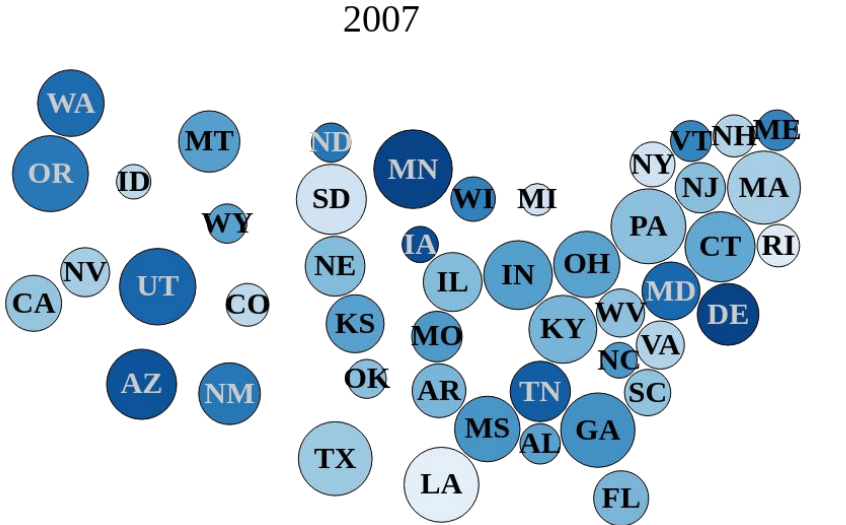
# Example 1

2007



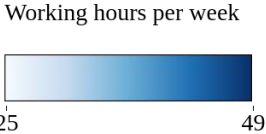
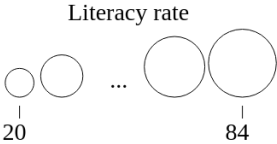


# Example 1



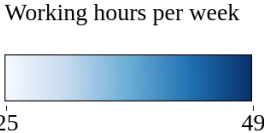
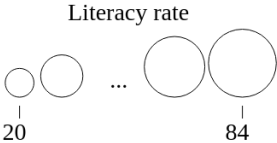
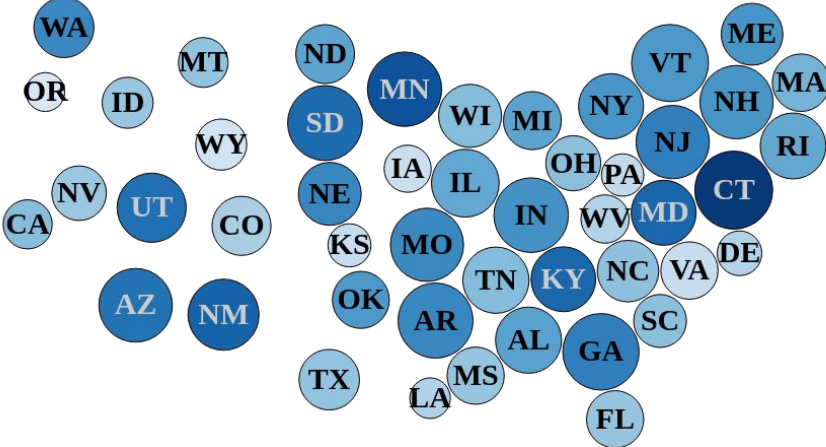
Answer: No correlation

The color and size of circles are not related

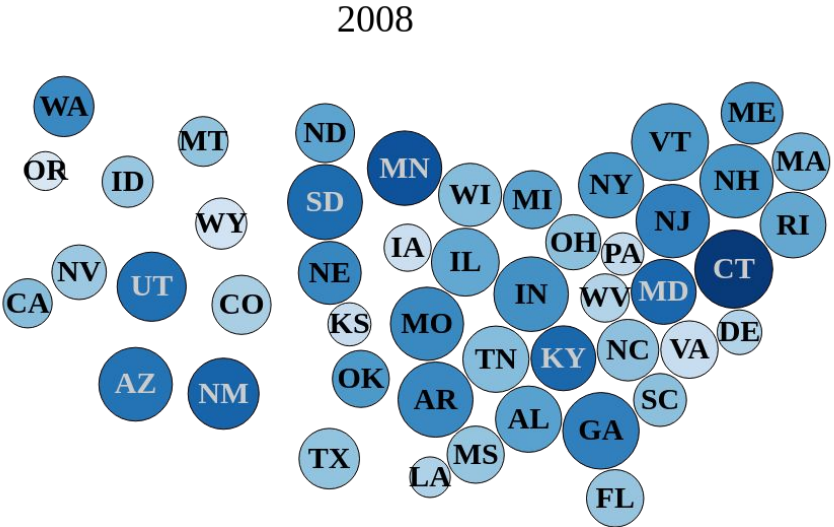


# Example 2

2008

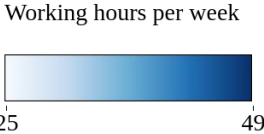
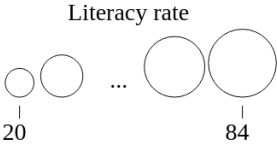


# Example 2



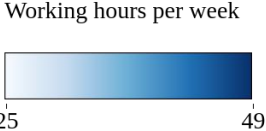
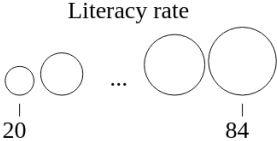
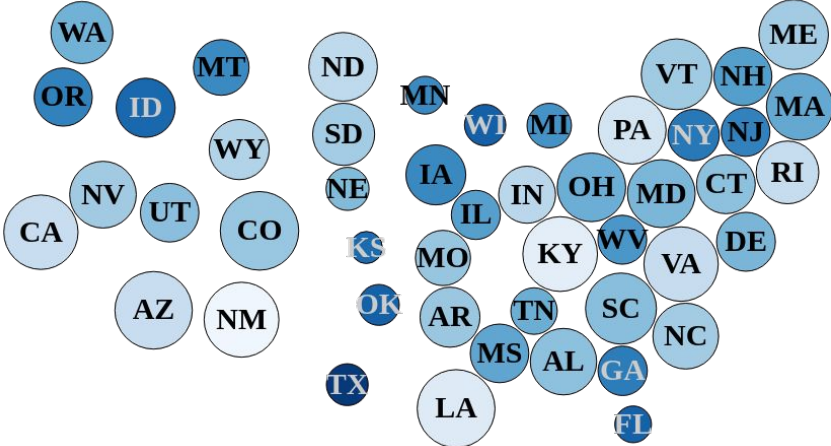
Answer: Positive

Small circles are lighter;  
big circles are darker

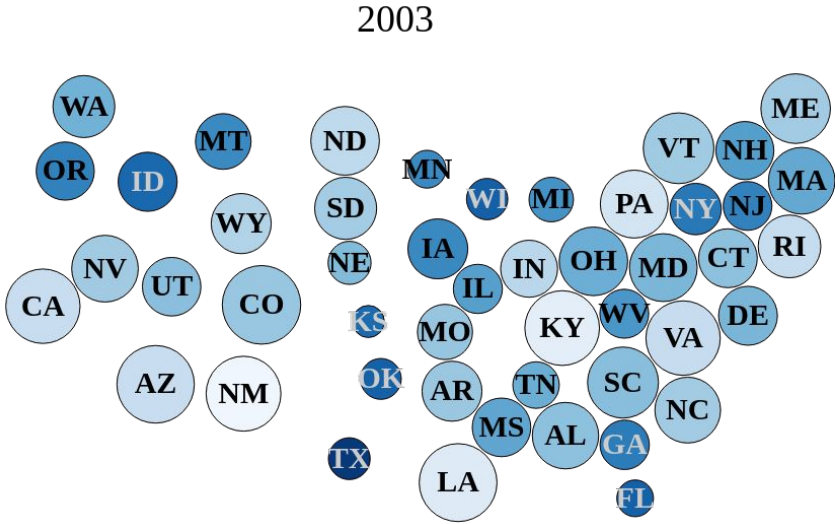


# Example 3

2003

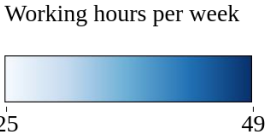
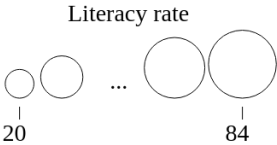


# Example 3



Answer: Negative

Small circles are darker;  
big circles are lighter



# Example 4



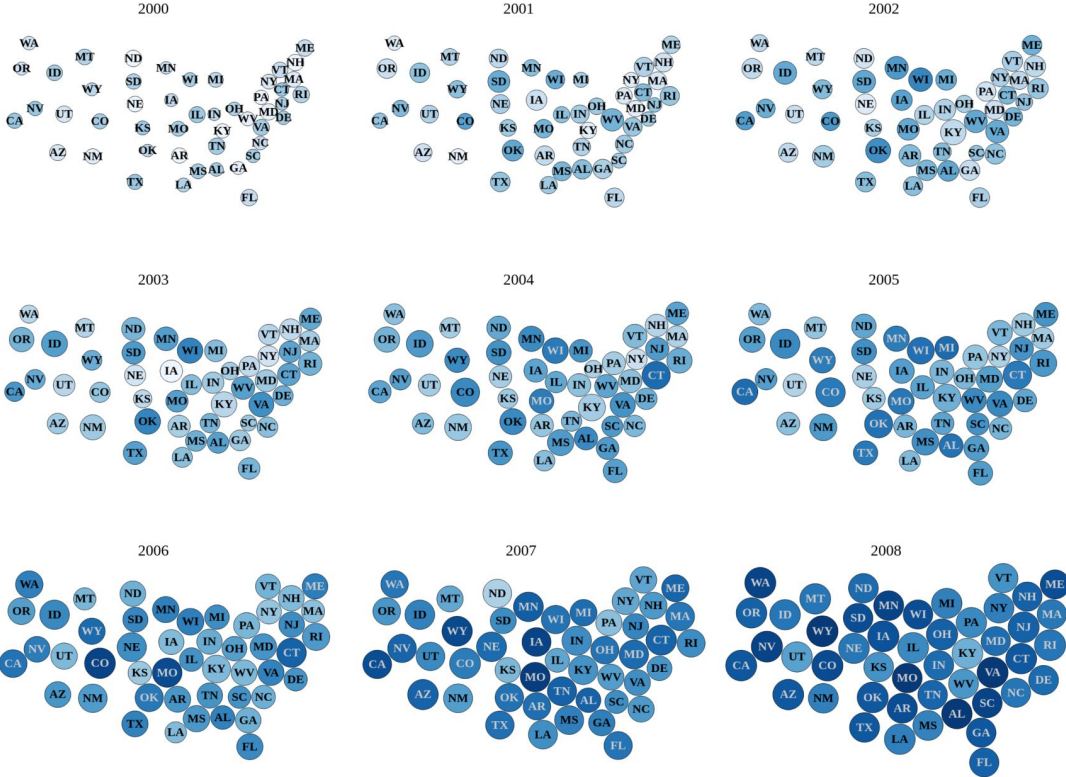
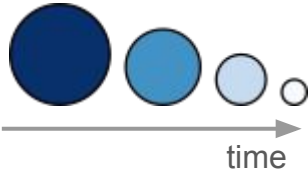




Positive correlation with monotonic evolution

# Monotonic evolution for Dorling cartogram

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

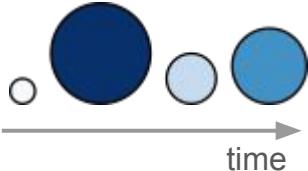




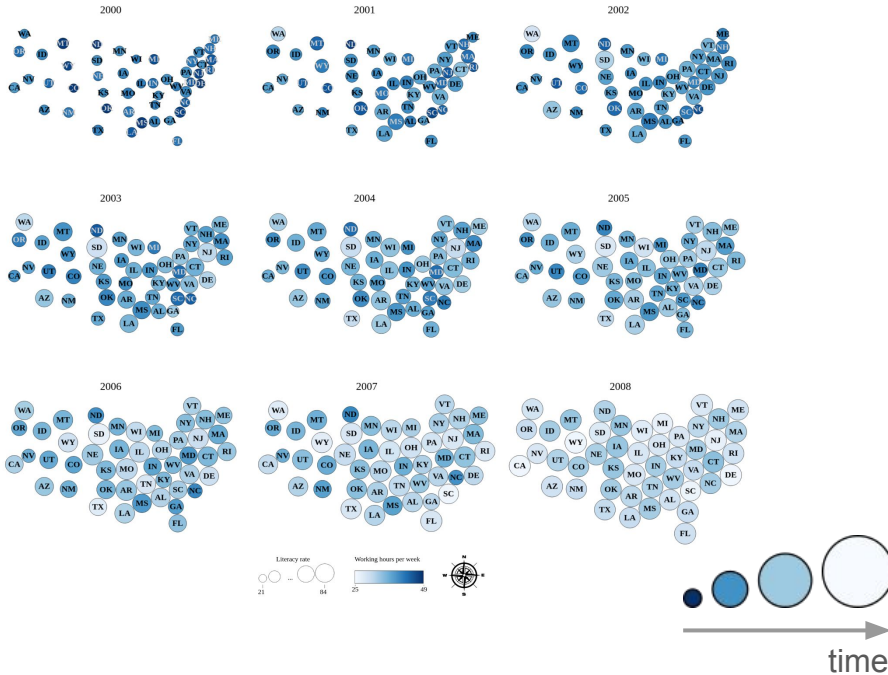
# Positive correlation without monotonic evolution

# Non monotonic Evolution for Dorling cartogram

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

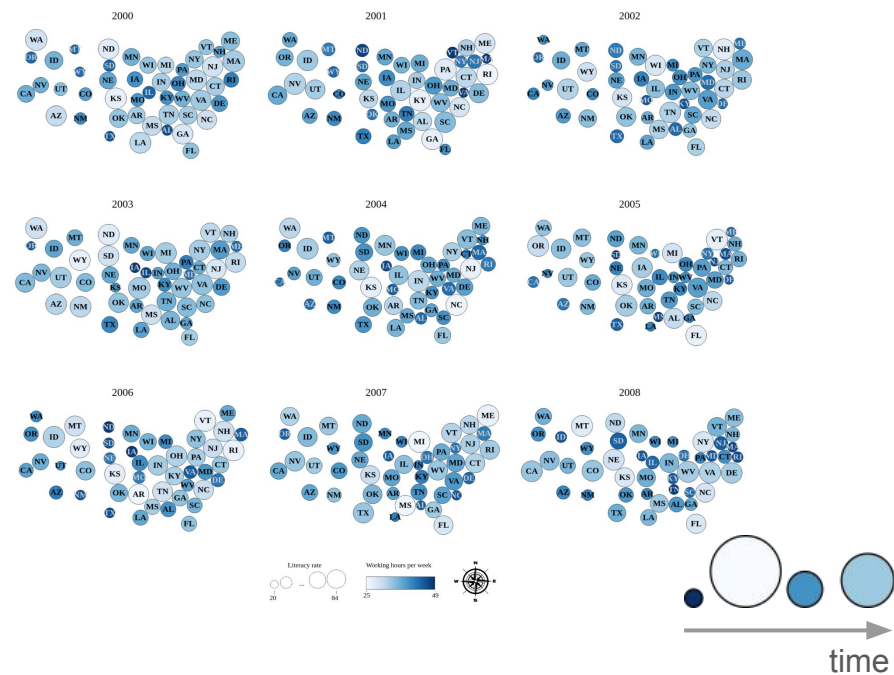


## Negative correlation with monotonic evolution



- ➔ 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**.