

Is teacher pay associated with student SAT performance?

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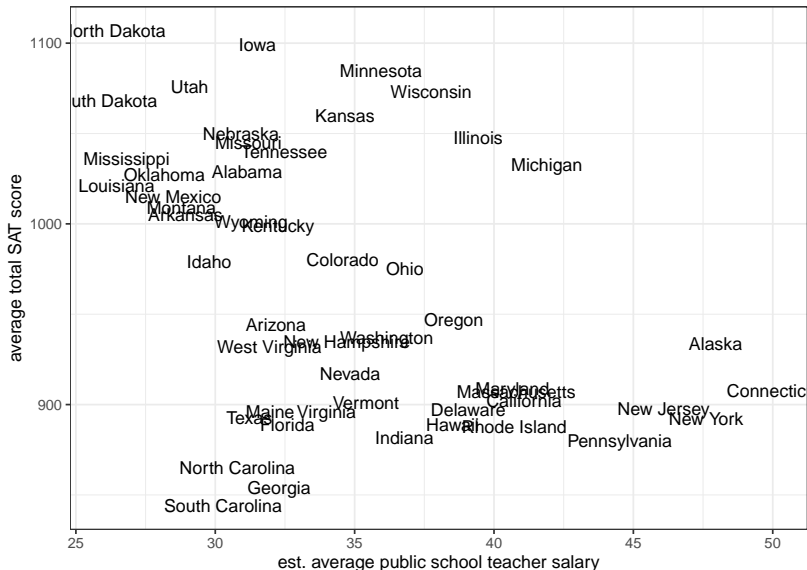
Central ideas

Topic: average US state-level SAT scores and how they relate to public school teacher salaries.

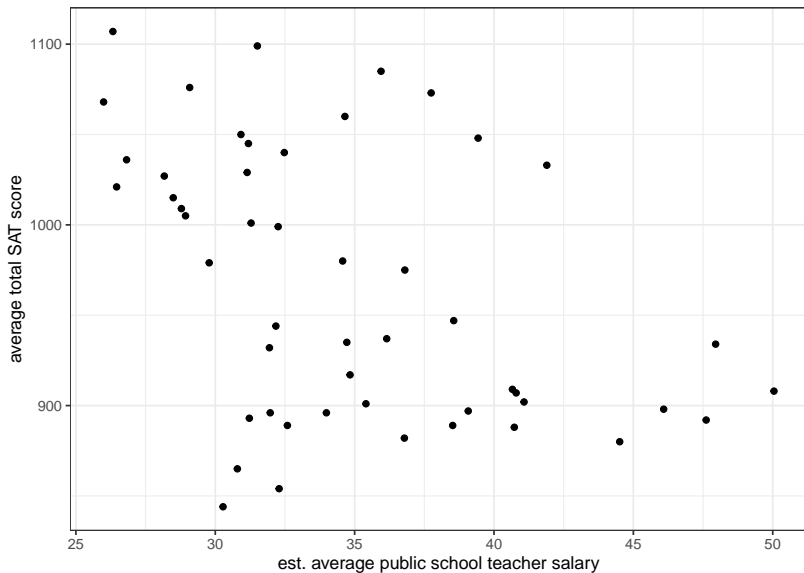
Pay attention to:

- the importance of thinking about multiple variables.
- using knowledge of the system (your mental model) to inform the analysis.
- keeping the story simple.
- the generalizability of the results.

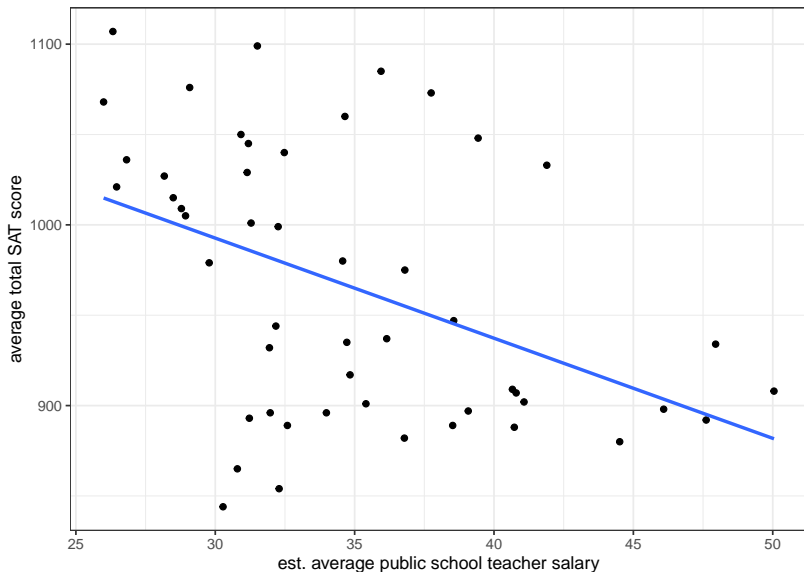
State-level SAT score data (1994-95)



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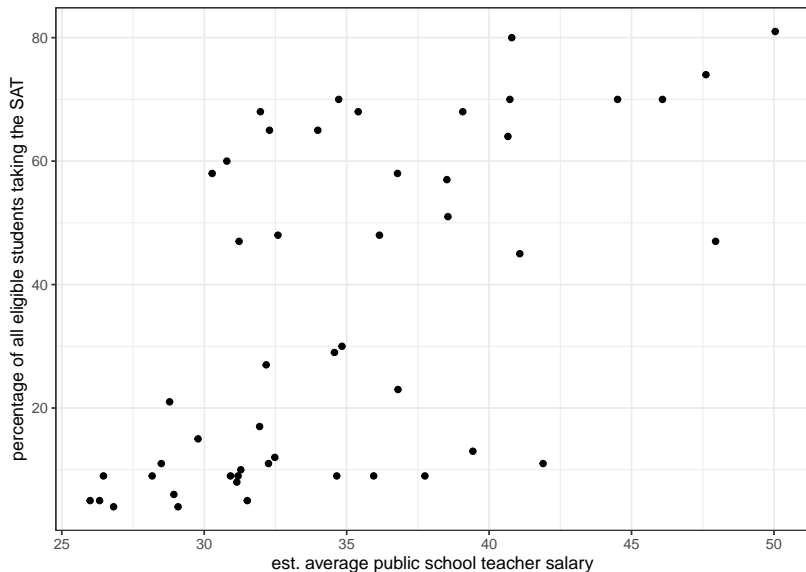
The SAT example

What is the outcome variable?

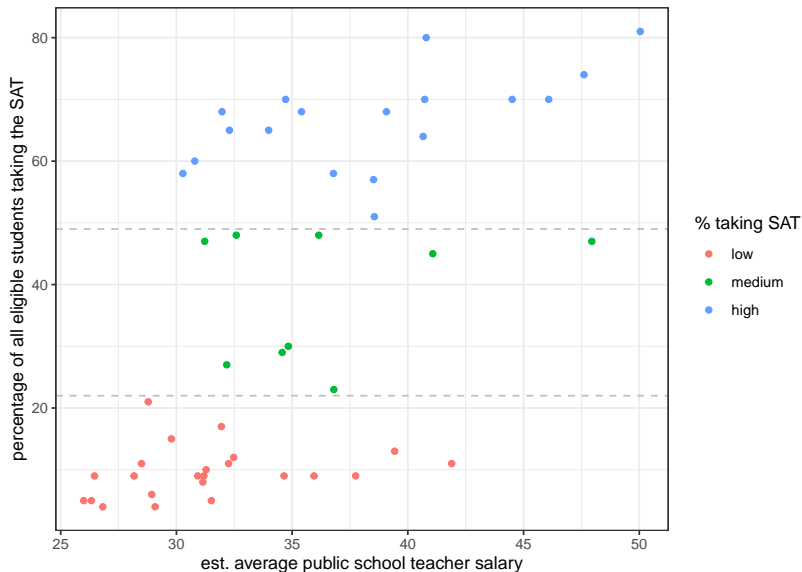
What is the covariate or predictor variable?

What other data might be part of this story?

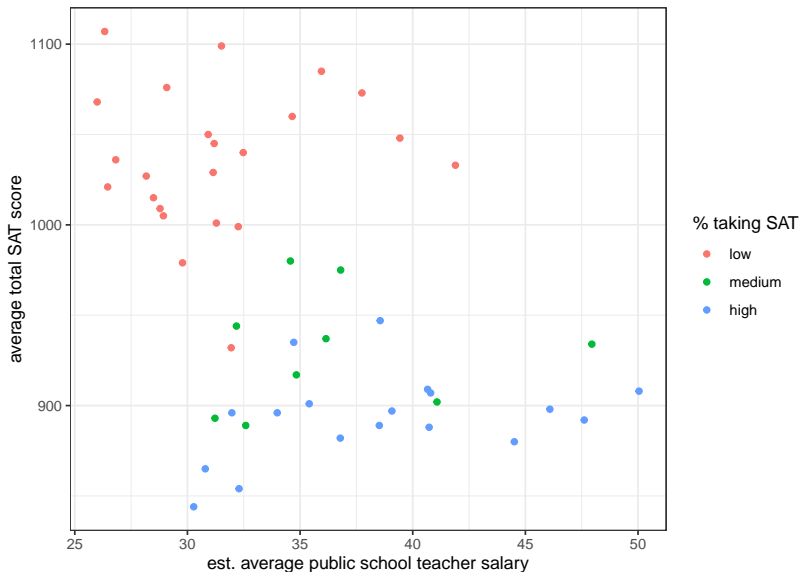
State-level SAT score data (1994-95)



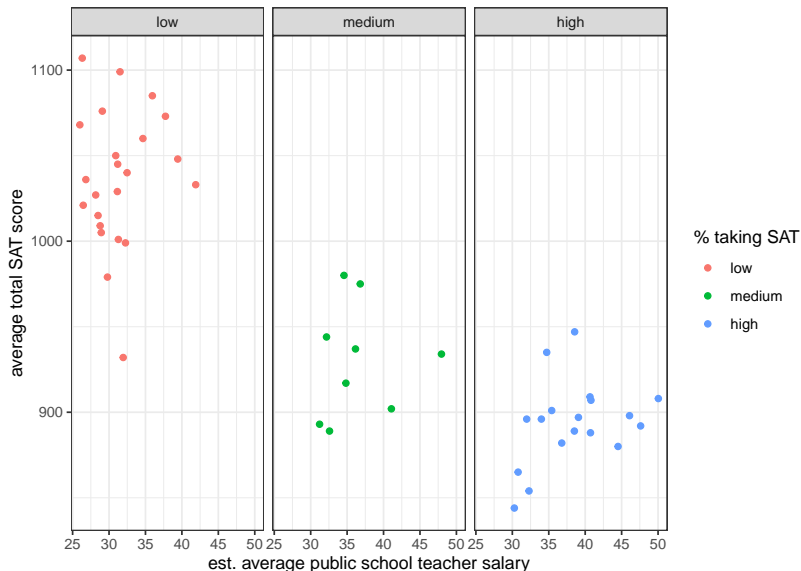
State-level SAT score data (1994-95)



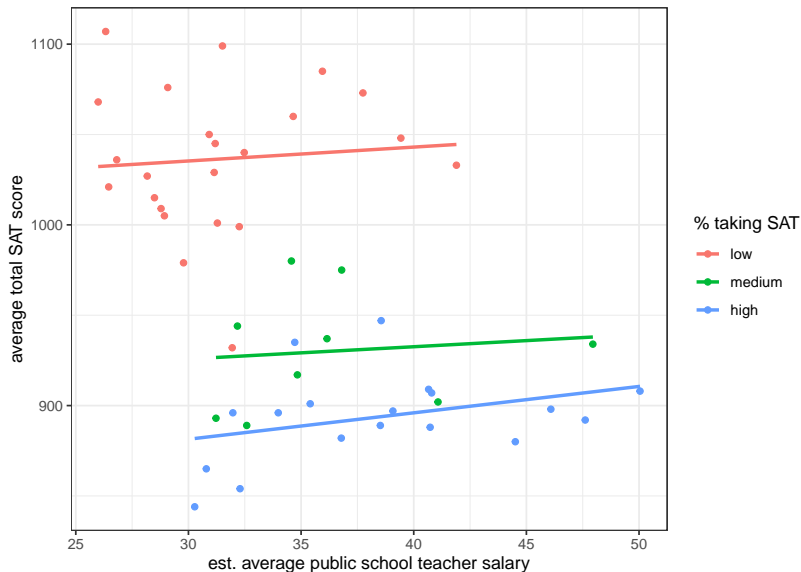
State-level SAT score data (1994-95)



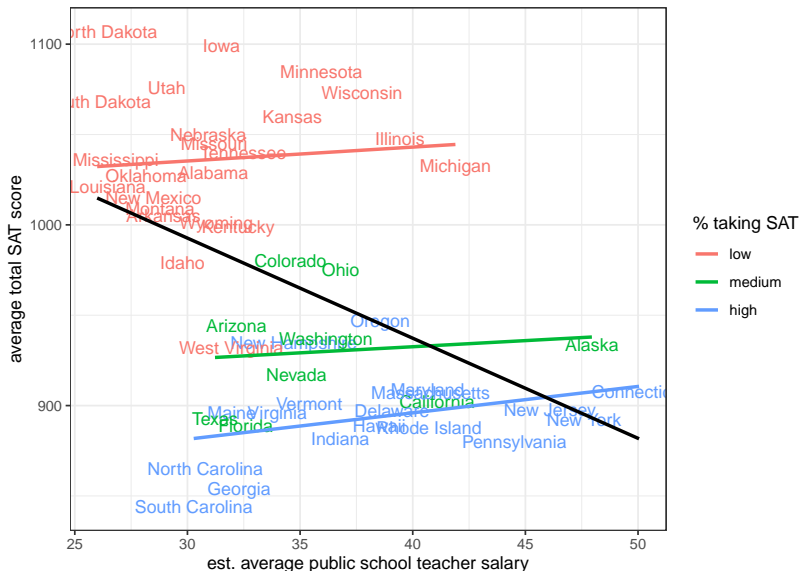
State-level SAT score data (1994-95)



State-level SAT score data (1994-95)



State-level SAT score data (1994-95)



State-level SAT score data (1994-95)

What can we conclude from all of this? (BTW, this is an example of "Simpson's Paradox".)

Appendix: Code for plotting

```
library(mosaicData)
library(ggplot2)
theme_set(theme_bw())
data(SAT)
SAT$fracgrp = cut(SAT$frac, breaks=c(0, 22, 49, 81),
                  labels=c("low", "medium", "high"))
ggplot(SAT) +
  geom_text(aes(x=salary, y=sat, label=state), size=4, show.legend=FALSE) +
  xlab("est. average public school teacher salary") +
  ylab("average total SAT score")
```

More plotting code available [here](#).