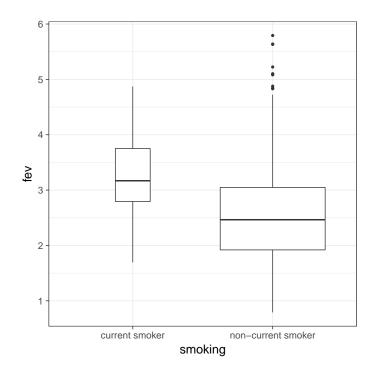
Graphics for inference

- What is my model telling me?
- How can I tell other people?

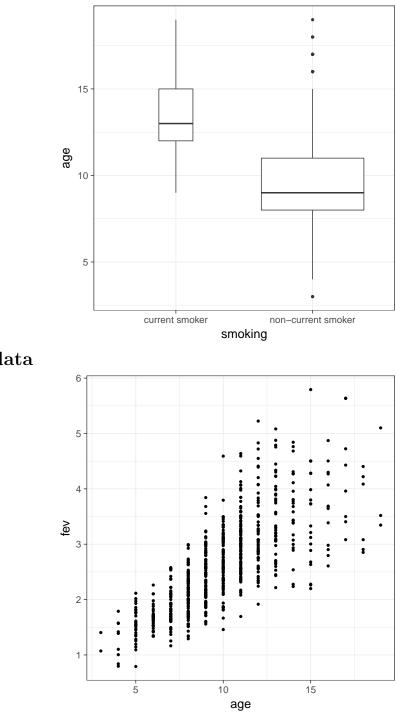
Principles

- Graphs tell stories better than tables do
 - Use graphs to illustrate comparisons
 - Be careful about *units*
- Distinguish between (scientific) variables and (statistical) parameters
- Keep P values in their place
- Show data if it doesn't interfere

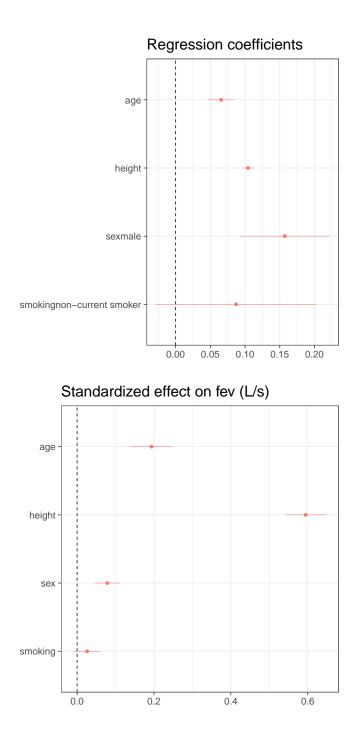
Smoking data

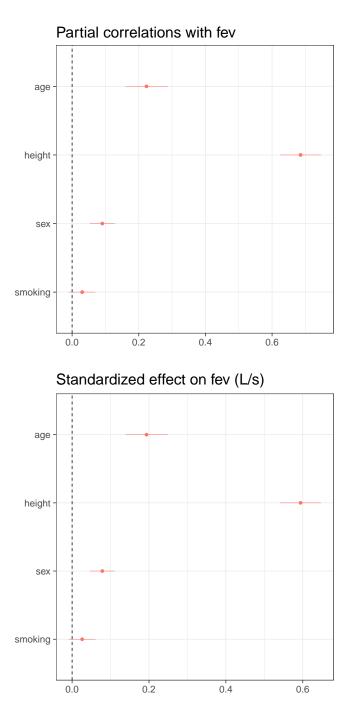


Smoking data



Smoking data



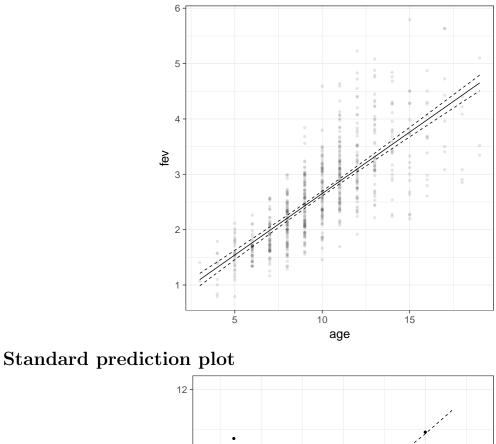


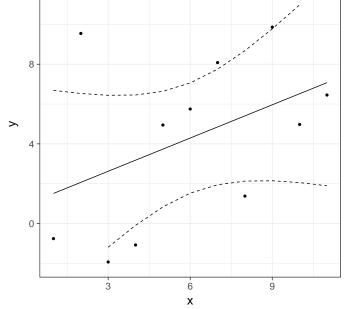
• Would P values add anything here?

Comparing effects on different response variables

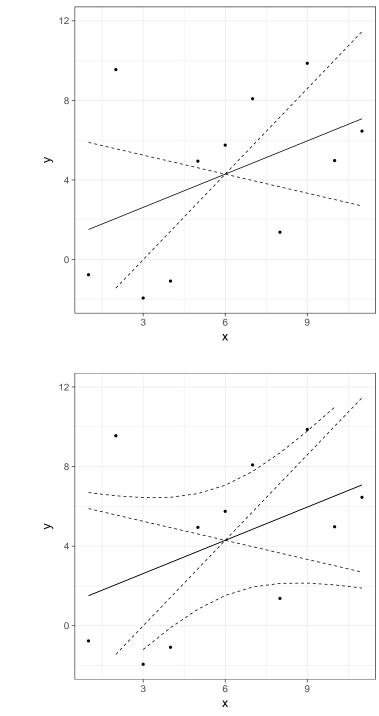
- Put response variables on same scale:
 - Standardize
 - Logs
 - Proportions

Shape of response





Marginal prediction plot



Combined

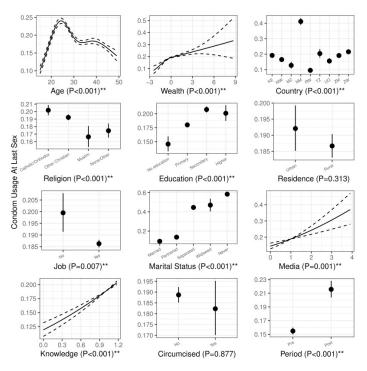
Variables vs. parameters

- A coefficient plot is most useful when each variable corresponds to a single statistical parameter
 - Binary predictor
 - Linear predictor

- More detailed shape information should be preferred when there is more than one parameter for a single logical variable
 - More than two categories
 - Splines and polynomials

No standard approach

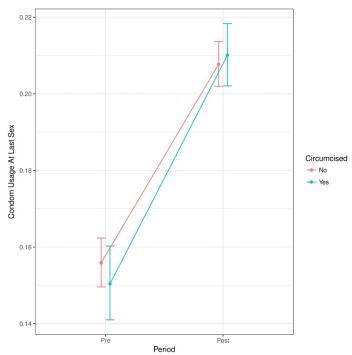
- There are many different ways to try to capture marginal effects of a single variable
 - Particularly if it's associated with more than one parameter
- JD likes to calculate from the model "center"
 - This is the average value from each predictor column of the model matrix
 - Relatively stable
 - A bit divorced from physical reality



P values

- We use variable-level P values as a standard for whether the *overall* pattern associated with a given variable is significant
 - This is not super-easy to interpret
 - But it is also not super-easy to think of a better alternative

Interactions



Scales and transformations

- Your model will often involve an original scale (where the data are collected) and a link scale (where the linear predictor lives)
- Which scale should you use for:
 - Calculations?
 - Displaying numbers to users?
 - Graphing?

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