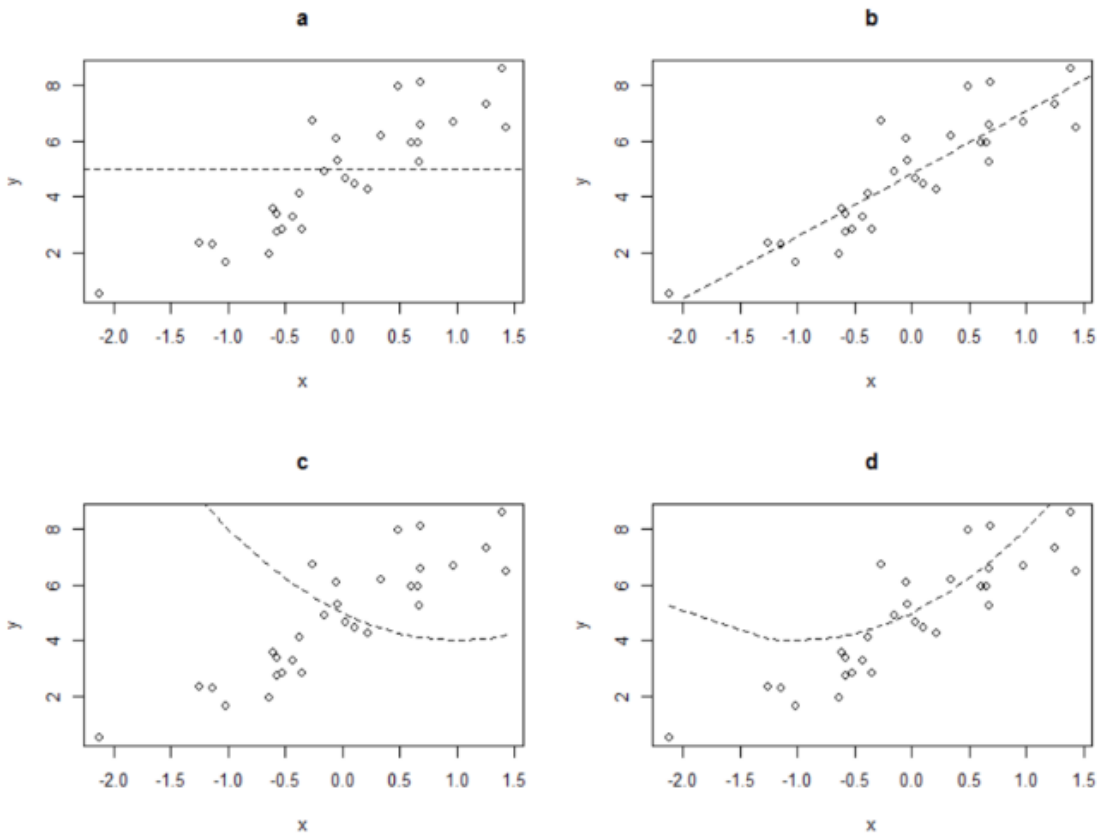
1. The figure below presents the fits of four different regression models to the same set of data, where there is a predictor variable (x) and a dependent variable (y) of interest. Which of the four plots reflects a model that fits the data well?



- ○ Plot (a)
- ◉ Plot (b)
- ○ Plot (c)
- ○ Plot (d)

2. A researcher at a large pharmaceutical company wishes to study the effect of a new experimental drug on the amount of pain suffered by people who frequently experience migraines. The researcher conducts a randomized experiment, where half of the migraine sufferers who volunteer receive the experimental drug, and half receive a placebo pill. The researcher then records a pain score two hours later, and wants to formally model the pain score as a function of experimental group and other confounding variables (age, BMI, gender, and race/ethnicity).

What is the dependent variable in this model, and what are the independent variables?

- ○ Dependent = Experimental Group, Independent = Pain Score
- ○ Dependent = Experimental Group, Independent = Pain Score, Age, BMI, Gender, Race/Ethnicity
- ○ Dependent = Pain Score, Independent = Experimental Group
- ◉ Dependent = Pain Score, Independent = Experimental Group, Age, BMI, Gender, Race/Ethnicity
- ○ None of the above

✓ **Correct**

3. Suppose that the migraine researcher was also interested in pain score trends immediately following administration of the drug. The researcher continues to collect pain score measurements at four, six, and eight hours after administration of either the experimental drug or the placebo pill. The researcher wants to then model the pain score as a function of the previously mentioned variables in addition to time since administration.

What needs to change about the model that the researcher is now fitting?

- ◉ The correlation of the repeated measures needs to be taken into account, and time since administration needs to be added to the model as an independent variable.
- ○ The correlation of the repeated measures needs to be taken into account, but nothing else needs to be change
- ○ Nothing; the same model mentioned in Problem 2 will be appropriate for studying the group differences.
- ○ Time needs to be added to the model as an independent variable; nothing else needs to be changed.
- ○ Time needs to be added to the model as a dependent variable; nothing else needs to be changed.

✓ **Correct**

4. After performing the analysis, the researcher writes a press release describing the results of the experiment, and claims that the new experimental drug will reduce pain by 25% based on the results of the modeling.

What else does the researcher need to say about this finding?

- ○ A. Nothing; this is an interesting effect that should lead migraine sufferers to use the drug.
- ○ B. The researcher should provide the predicted pain scores in both groups based on the model, in addition to measures of uncertainty in the predicted scores, for reference.
- ○ C. The researcher should provide a confidence interval for this predicted effect based on the fitted model.
- ◉ Answers B and C

✓ **Correct**