Teacher notes

5: Intro

- What are their aims for the module.
- What sorts of data do we want to analyse? Do you have your own data?
- Reflection on working styles/practices for learning R.

10: What is the point of repeated measures? What benefits do we gain?

15: Generate examples of repeated measures data and give examples myself

20: School exercise

30: Schools feedback/discussion

35: More schools, less information plot exercise

40: Quick recap on mean and variance.... Sum of the squares. Std Deviation is sqrt of variance. (Sample variance is N-1)

50: Independent and identically distributed assumption. Ask them to generate examples which would/would not be IID

60: Break

70: Splitting the error graphs ... ask students to guess meaning

95: Explicitly go through splitting error term slide and intro to mixed models

105: RCT example: Followup question: Given a fixed budget, would it become more or less important to sample as many different patients as possible, compared with sampling the same patients repeatedly?

115: Quick demo of reshaping and plotting the fit data.

Homework: Exercise online - reshaping data in prep for next week

Schools notes

- Applied perspective -> no single right answer
- wouldn't pick one of the answers near the extremes because
- balancing different concerns:

These:

- Generalisability to all schools
- Practical/cost/time (although strictly this wasn't part of the question)
- Fair estimate for each school (because low scores could have consequences for teachers, if results were published)
- See if schools *vary* in how effective they are?

But this question was about estimating the **average effectiveness** across the whole of the UK. So it's really a question about how to maximise **power**.

Highlight that POWER is not always highest with highest N.... also have to think about k (groups)

If students within schools are similar then ***we might gain more information*** when we sample from a new school, even though that costs us more and the total N goes down.

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Schools

Imagine you work for the UK Department for Education (DfE).

Your task is to find out whether a new educational intervention is effective. The new intervention has been rolled out in 1000 randomly-selected schools in the UK.

- You have a budget of around £10,000.
- The cost to visit a single school is £100
- The cost to measure each pupil is £10
- The average size of a school in the UK is roughly 250.

Would you prefer to collect data from:

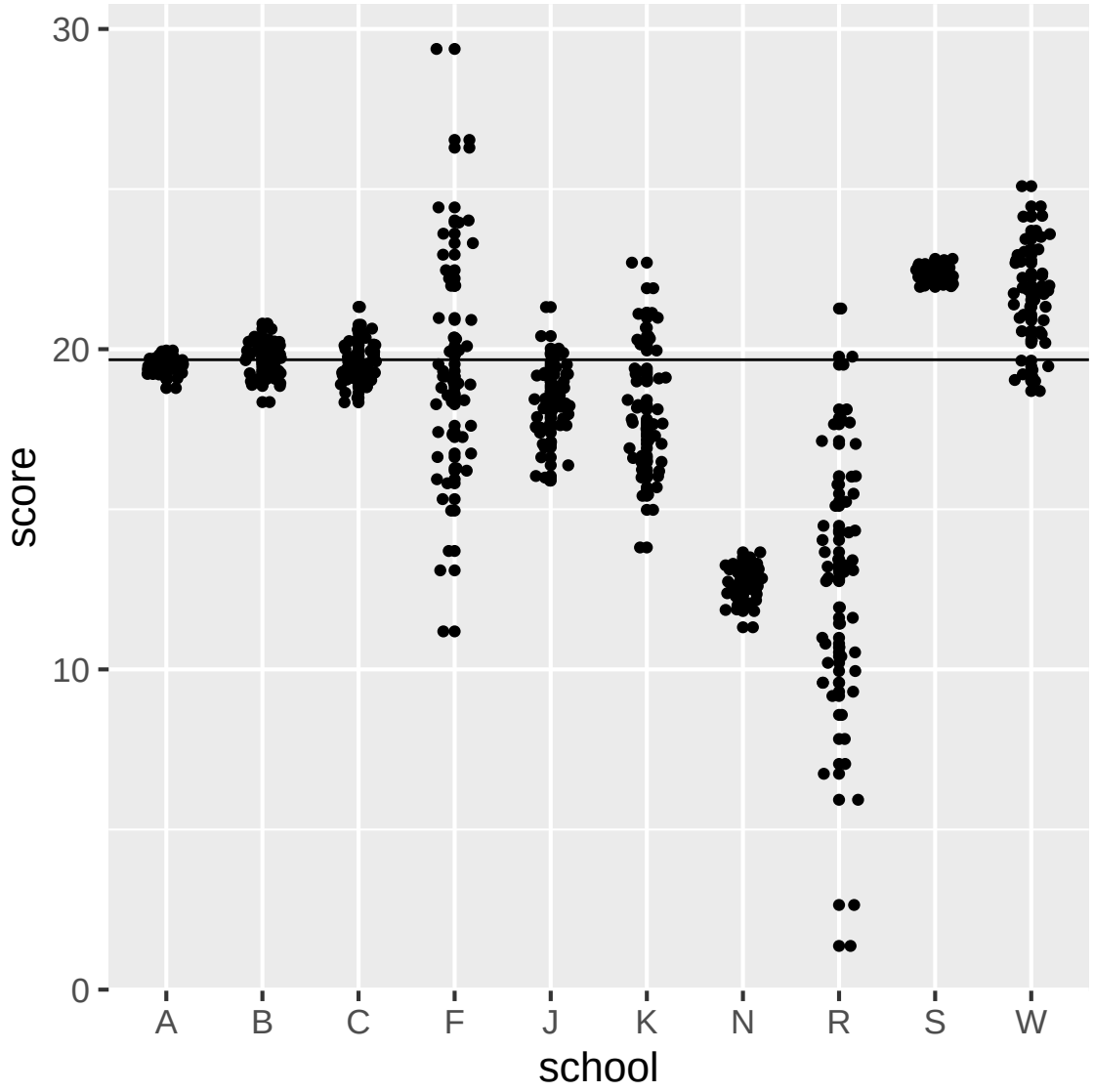
```
Warning: `as.tibble()` is deprecated, use `as_tibble()` (but mind the new semantics).
This warning is displayed once per session.
```

- 970 children across 3 schools
- 870 children across 13 schools
- 770 children across 23 schools
- 670 children across 33 schools
- 570 children across 43 schools
- 470 children across 53 schools
- 370 children across 63 schools
- 270 children across 73 schools
- 170 children across 83 schools

These options all cost around £10,000.

Discuss the problem as a small group. Identify the different tradeoffs involved.

Schools plot task



- Which schools would you most and least want to sample another child from? Why?
- Why would it be better to sample from another school, than another pupil from school in the set plotted?