Experimental design

How would you evaluate fertilizer effect?

Discuss with partner (5')

Figure 1:

Replication!

Figure 2:

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- Traditionally, ecology studies have had too low sample sizes.
- Hence missing many subtle effects, and prone to bias.
- Complex models (w/ many predictors, interactions etc) require **high** sample sizes.

Sample size is very important

See *The evolution of correlations*

Stopping rules:

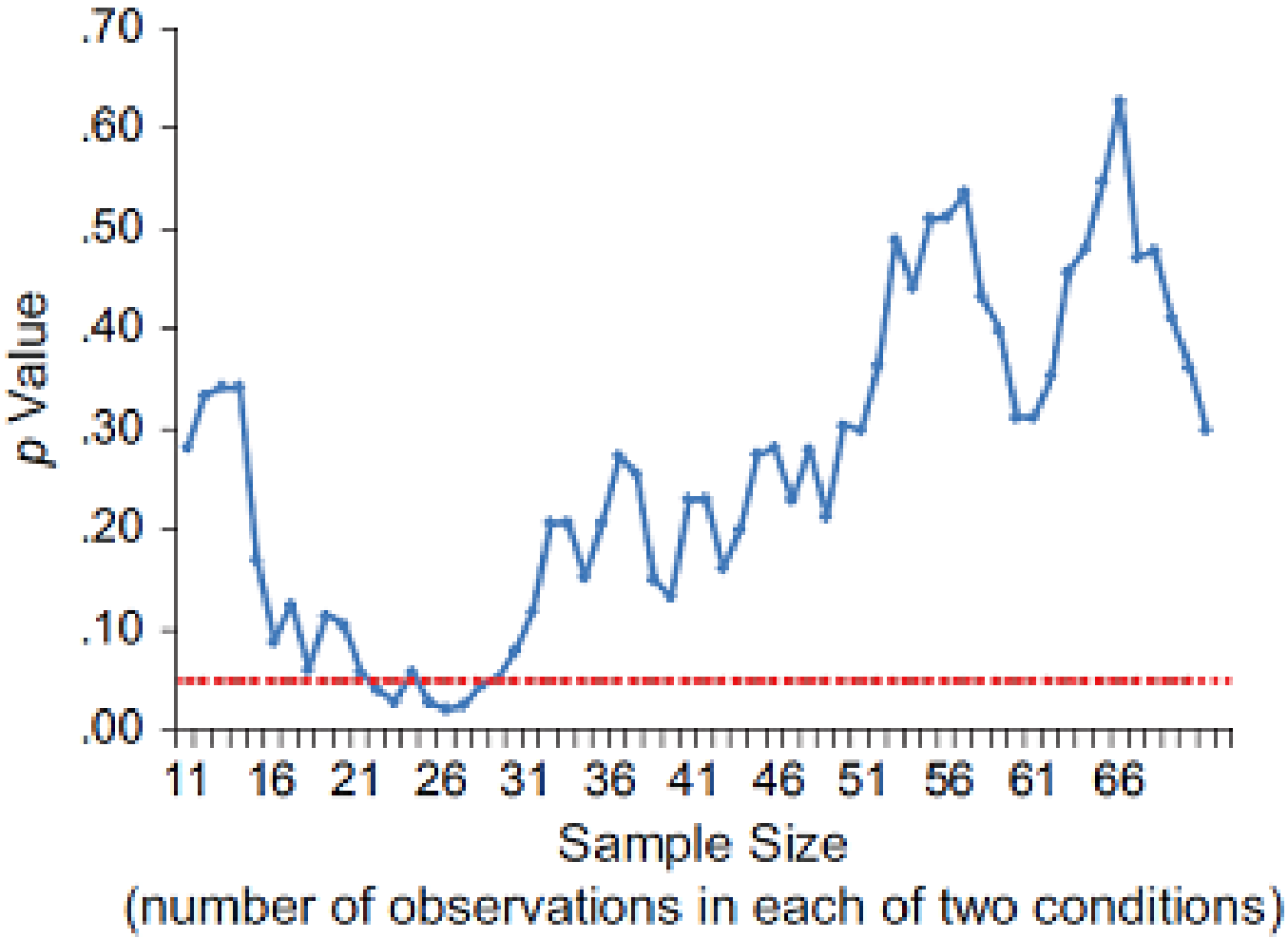

Fig. 2. Illustrative simulation of *p* values obtained by a researcher who continuously adds an observation to each of two conditions, conducting a *t* test after each addition. The dotted line highlights the conventional

Randomization

Figure 4:

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- Stratify: randomize within groups (e.g. species, soil types)

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- Measure before & after treatment.
- Consider blind designs to avoid observer bias.

To read more

- Ruxton & Colegrave. Experimental Design for the Life Sciences. OUP