Babraham Bioinformatics

Exercises:
Sample Size estimation

Version 18.04

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Exercise 1:

(Data from: http://www.sciencealert.com/scientists-are-painting-eyes-on-cows-butts-to-stop-lions-getting-shot)

Scientists have come up with a solution that will reduce the number of lions being shot by farmers in Africa - painting eyes on the butts of cows. It sounds a little crazy, but early trials suggest that lions are less likely to attack livestock when they think they're being watched - and less livestock attacks could help farmers and lions co-exist more peacefully.

Pilot study over 6 weeks: 3 out of 39 unpainted cows were killed by lions, none of the 23 painted cows from the same herd were killed.

- Do you think the observed effect is meaningful to the extent that such a 'treatment' should be applied? Consider ethics, economics, conservation …
- Run a power calculation to find out how many cows should be included in the study (assume a balanced design).
- Unbalanced design: estimate samples sizes of the unpainted group was 2.5 bigger than the painted one

Exercise 2:

(Data from *'Discovering Stats with SPSS'* by Andy Field*)*

Pilot study: 10 arachnophobes were asked to perform 2 tasks:
Task 1: Group1 (n=5): to play with a big hairy tarantula spider with big fangs and an evil look in its eight eyes.
Task 2: Group 2 (n=5): to look only pictures of the same hairy tarantula.

Picture	Real Spider
25	45
35	40
45	55
40	55
50	65

Anxiety scores were measured for each group (0 to 100).

- Enter the data (Excel) so that you can extract the values for a power calculation
- Run a power calculation (assume balanced design and parametric test)
- On second thought, scores are often non-normally distributed and a non-parametric approach might be more appropriate. Estimate the new sample sizes.