

Exercises:

Sample Size estimation

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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.

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.

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