Statistics with Spa  ows

Lecture 14

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Outline

- Repeatability
- Pitfalls

Repeatability

- How consistent something is within a group, compared to the whole sample

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$$R = \frac{\sigma_A^2}{\sigma_A^2 + \sigma_W^2}$$

- It’s got lots of interesting uses in biology.

Observer repeatability

- Measuring tarsus consistently is not easy
- Some people measure it 3 times and take the mean
- Are observers consistent in their measures?

Indivdual behaviour - personality

- Do birds always behave the same way?
- Different from others?

Ecology

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- Is earthworm abundance consistent between day in the same plots?

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$$\sigma_A^2 = \frac{MS_A - MS_W}{n_0}$$

$$\sigma_W^2 = MS_W$$

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b_i =3,3,4,3,3,3

c_i =5,5,4,5,5,1

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- Heterogeneous dataset

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b_i =3,3,4,3,3,3,4,2,5,5,7

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- In ecology we have those often. In exact sciences less so (medicine, any planned experiments)

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$$n_0 = [\frac{1}{a\text{-}1}[\sum_{i=1}^{a} n_i - (\frac{\sum_{i=1}^{a} n_i^2}{\sum_{i=1}^{a} n_i})]$$

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n_i = sample size in each group i

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a_i =1,1,2,1,1,1 n = 6

b_i =3,3,4,3,3,3,4,2,5,5,7 n = 11

c_i =5,5 n = 2

$$n_0 = \frac{(3 * 6) - (\frac{3 * 36}{3 * 6})}{2}$$

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$$n_0 = \frac{(6 + 11 + 2) - (\frac{36 + 121 + 4}{6 + 11 + 2})}{2}$$

$$n_0 = 5.27$$

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Learning aim

- Repeatability is intra-class correlation coefficient
- Ratio of how much variance is explained by groups
- N_0 is horrible

Do it NOW!

- HO 14

- Calculate the repeatability of body mass within individual birds.
- –Calculate the between–observer repeatability of your study group (A or B) of both wing, and tarsus! Explain what you did, and why. Justify!
- Report in writing, and on blackboard. Discuss!