Full details in

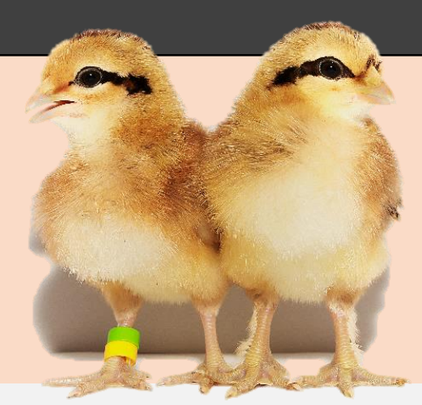
LARGER IS NOT ALWAYS BETTER:

LINKÖPINGS UNIVERSITET
IFM BIOLOGY

Does group size affect cognition?

Susana Garcia Dominguez
susga670@student.liu.se

Supervisors: Laura Garnham & Hanne Løvlie



BACKGROUND

The mechanisms driving cognitive variation within species are still unclear. The Social Intelligence Hypothesis proposes that complex social challenges, such as those that arise from group-living, may contribute to better cognitive performance. Within species, individuals from larger groups have been shown to outperform those from smaller groups in cognitive tests. However, the causality of this relationship remains unknown.

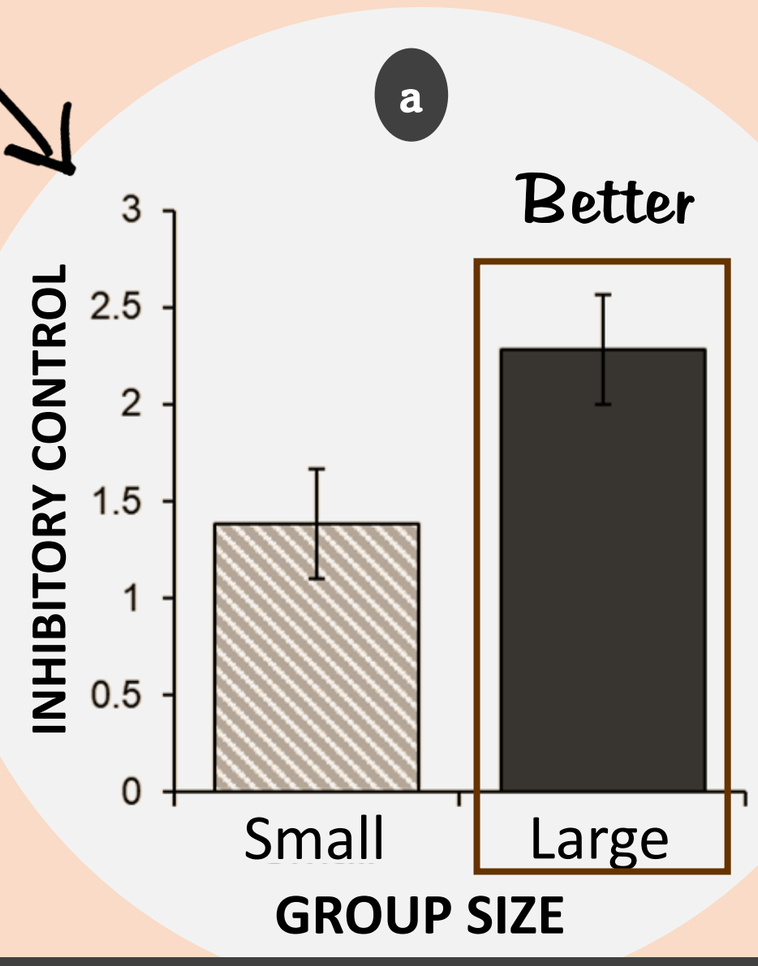
I experimentally tested if group size affected cognitive performance of red junglefowl chicks and if this effect lasted to adulthood

RESULTS

Effect of group size in

Group size had <u>no effect on reversal</u> learning.

Group size effect on inhibitory control and discriminative learning did <u>not</u> last to adulthood.



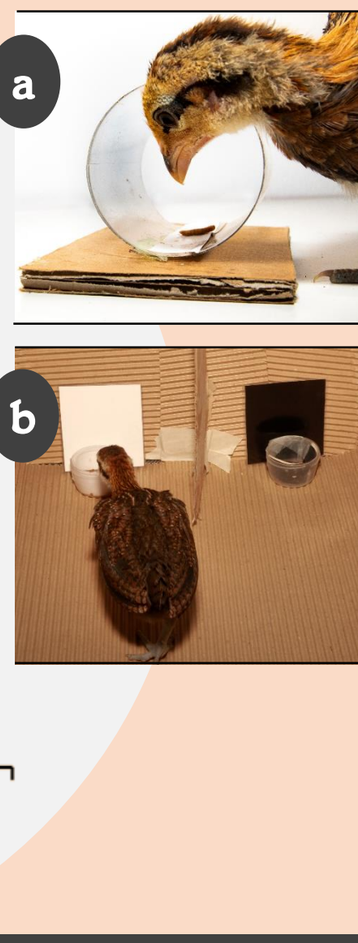


Fig. 1. Chicks in large groups had better inhibitory control (a; z = 1.31, estimate = 0.33, N = 54), but were slower at discriminative learning (b; z = 3.28, estimate = 0.72, N = 57). Results from GLM. Mean ± SE shown.

CONCLUSIONS

- Group size causally explained within-species cognitive variation, but its effect was task-dependent and both positive and negative. Thus, my study weakly supports the Social Intelligence Hypothesis.
- Unlike reversal learning, discriminative learning was more affected by the environment. This was also found in previous work on heritability between these cognitive traits.
- Further, group size had no effect on inhibitory control and discriminative learning in adult females, which suggests that both traits are developmentally plastic.

METHODS

For the first 5 weeks of life, red junglefowl chicks (n=76), *Gallus gallus,* were assigned to a small (n=7, $n_{replicates}$=4) or large (n=16, $n_{replicates}$=3) group size. Each test chick (n=58) was presented with a task on: 1) inhibitory control, 2) discriminative- and 3) reversal learning. Chicks lived in one same-sex group from 5 weeks of age onwards. Adult females (n=31) were tested again in 1) inhibitory control and 2) discriminative learning. The reward was always a piece of mealworm. Inhibitory control = number of trials, out of a total of five, in which a bird attempted to peck at the reward through the cylinder instead of obtaining it through a tube detour. Discriminative- and reversal learning = number of trials a bird needed to reach the learning criterion (i.e. six correct colour choices in a row; correct=rewarded).