

Sex differences in the visual lateralization of black-capped chickadees in a rescue paradigm

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Introduction

- ❖ Lateralization describes the left/right side bias of an individual meaning that one side would be more dominant compared to the other.¹
- ❖ Rescue behaviour is an altruistic behavior shown by others towards an individual in distress. 4 components of rescue behaviour are:
 - The victim must be in distress.
 - The rescuer is in a risky situation while providing help.
 - The rescuer is not rewarded for their actions.
 - The behaviour of the rescuer is relevant to the situation.²
- ❖ Lateralization helps understand how the two sides of bird's brain communicate with each other without a corpus callosum. This helps us further understand the perception of the birds. Birds may use one eye/side over another for reasons such as visual discrimination in foraging tasks or for viewing familiar conspecifics.
- ❖ Overall, the preference for using the right or left eye in birds is likely influenced by a combination of factors, including the task being performed, the visual information available, and the individual bird's experiences.¹

Purpose

- ❖ To find the lateralization of black capped chickadees when it comes to a model bird VS a live bird in rescue behaviour paradigm

Methods

Experimental 1: live bird conditions

- ❖ We used 12 adult black-capped chickadees, 8 male and 4 female. 8 birds were from the same colony and 4 were from another room, but all the birds were from the same colony as their experimental partner.
- ❖ There are two conditions in this paradigm: free/home and trapped-other.
 - In the trapped-other condition, each bird acted once as the rescuer and once as the victim.
 - In the free/home condition, one bird was assigned free and one home. Each bird recorded were able to act once as free and once as home.

Experimental 2: model bird conditions

- ❖ A total of 8 individuals were used - 4 males and 4 females.
- ❖ The birds were all different from the first experiment but the birds used in this experiment were from the same colony room as the birds in the live bird conditions.

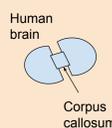


Fig 1.

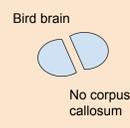


Fig 2.



- ❖ During both experiments, we recorded the number of times the rescuer/free-bird/live bird came in contact with the trap and the lateralization.

Results

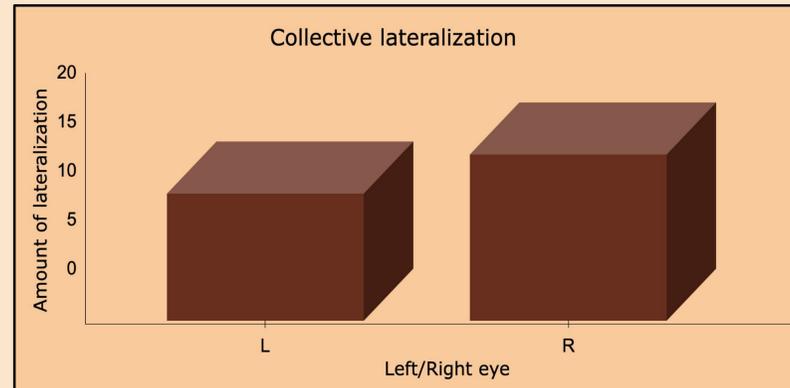


Fig 3. There is a difference in the right eye compared to the left eye. But the difference is insignificant, meaning that there is no lateralization.

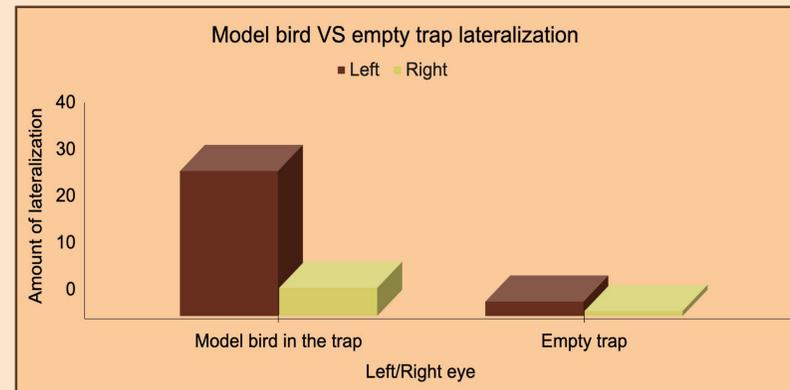


Fig 4. There is a higher bias in the left eye compared to the right eye in the model bird condition, meaning that there is lateralization. But the difference is insignificant, when it comes to empty trap, meaning that there is no lateralization.

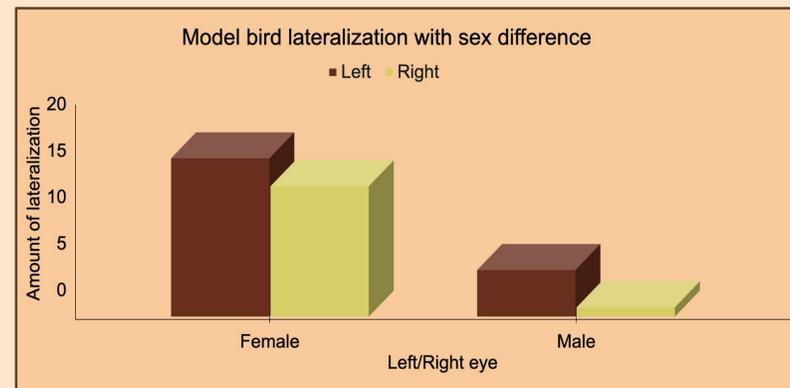


Fig 5. There is a huge gender based difference in the frequency of lateralization between male and female. There is also a higher bias for left eye compared to the right eye meaning that there is lateralization.

Discussions

- ❖ When looking at model bird condition:
 - There seems to be sex based differences as females were more active during the trials and had a left eye bias.
 - The males are more dominant than the females, which requires the females to take on more risks.
 - The left eye bias can be associated with look out for novel situations. An encounter with the model bird is a novel and risky situation. This could be a reason why there was a sex difference in lateralization.
 - Although males were not as active, they also showed a left eye bias, which shows a higher likelihood that the model bird is considered a novel object.
 - When comparing the live birds vs model birds, there was no bias with the live birds, but there was a bias in the model bird condition. The presence of lateralization indicates that birds can differentiate between the live bird and the model, showing a connection in their brains that aids in discrimination.

Future Directions

- ❖ While looking at the model bird condition:
 - There was a huge sex based difference.
 - Male chickadees are more dominant compared to the female, however, the females are the more risk-taking one and maybe why females were more active³.
 - Further studies with females can help us understand the specific reasons for the sex based difference found during the model bird condition.
 - The model bird conditions showed a bias, by utilizing novel objects or taxidermied birds in another experiment, we can understand the perception of birds to further discern how the communication between the hemispheres works and why they work the way they do.

References

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Women and Gender Equality Canada

Femmes et Égalité des genres Canada



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