

Lateralized behavior in white-handed gibbons

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Introduction

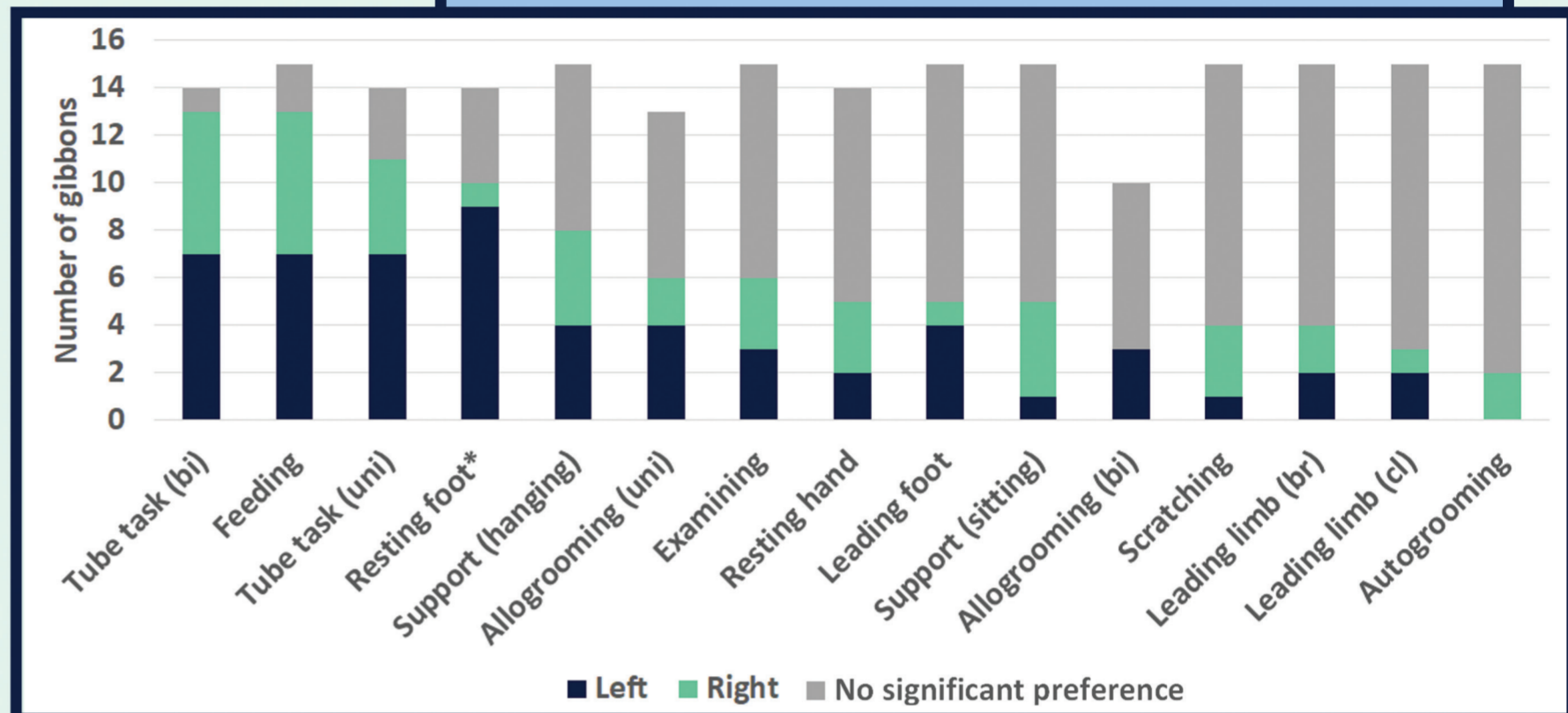
Evidence for handedness at the population-level in nonhuman primates is inconclusive and thus the evolutionary origins of human handedness are still not entirely understood. Although laterality studies are often focused on nonhuman primates, only few studies have addressed laterality in gibbons.



Results

Significant side preferences were found for all behaviors at the individual level, but not at the population-level. None of the gibbons were consistent in their hand preference across all observed behaviors.

Below: The number of significant left/right hand or foot preferences per motor pattern. * Of the gibbons with a significant preference for "resting foot", a significant majority was left-preferent.



Aim

The aim of the present study was to assess lateralized behavior in one species of gibbons, the white-handed gibbon (*Hylobates lar*), for a variety of 13 spontaneously occurring behaviors and a manual (tube) task which is not part of their natural behavior.

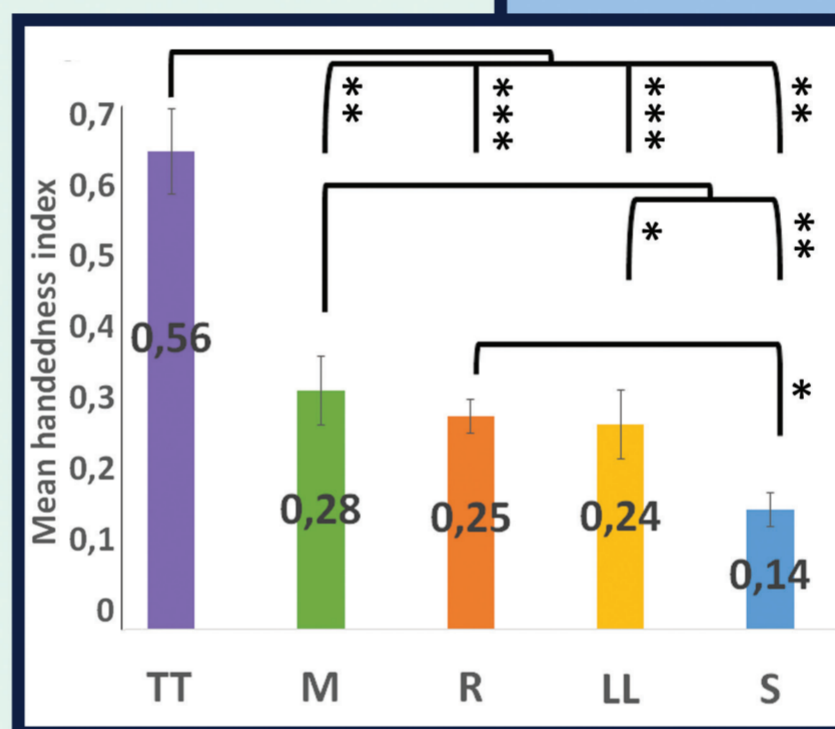
Methods

15 white-handed gibbons were observed in five different zoos located in both Sweden and the Netherlands. Left and right hand- and foot-use for all spontaneously-occurring motor patterns was observed continuously. Additionally, a video camera was used to record hand use for the tube task.

Below: All spontaneously-occurring behaviors and tube task-related behaviors that were observed in the present study.

| MANIPULATION | LEADING LIMB |
|-------------------------------|--------------------------|
| Autogrooming | Leading hand brachiation |
| Scratching | Leading hand climbing |
| Feeding | Leading foot |
| Examining flat surface | RESTING POSITION |
| Unimanual allogrooming | Resting hand |
| Bimanual allogrooming | Resting foot |
| SUPPORT | TUBE TASK |
| Supporting hand while hanging | Unimanual tube task |
| Supporting hand while sitting | Bimanual tube task |

Pictures from left to right: resting position and bimanual tube task.

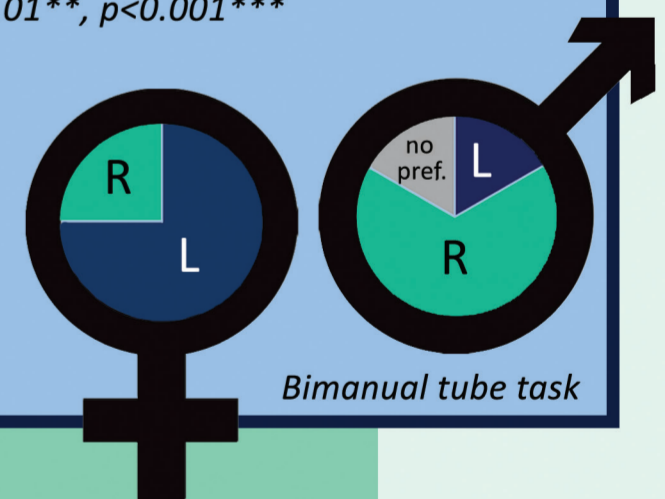


The gibbons displayed significantly stronger hand preferences for the tube task-related (TT) behaviors compared to all spontaneously occurring behaviors.

Side preferences in the manipulation (M) and resting position (R) categories were significantly stronger than those in the support (S) category. Manipulation preferences were also significantly stronger than those for leading limb (LL).

Left: Mean handedness index per category. $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$

In the bimanual tube task, females displayed a tendency towards a left side bias, while males tended to display a bias to the right.



Conclusions

Significant side preferences at the individual level were found within all 15 motor patterns.

Similar to other nonhuman primates, the gibbons in the present study were only consistent in their hand preference across some tasks that required similar movements.

Altogether, these findings support the notion that population-level handedness may be restricted to humans.

