Qeios

Peer Review

Review of: "Social and Spatial Drivers of the Multitiered Structure of Zebra Finch Social Networks"

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This is a very well-written and well-considered piece of work. The authors have done a good job of explaining their aims, methods and approaches, and research outcomes. The use of novel technology to make social manipulations and maximise data points per individual is a real strength of this research. I have only a few minor comments for potential improvements.

The use of bar-coded individuals to enable precise detection of individual animal behaviour makes for a robust dataset that provides clear evidence for who is choosing to spend time with whom. The study design of understanding the effects of social disruption on individual social choice (i.e., introduction to novel conspecifics) also allows the researchers to understand how quickly stable social bonds will form.

Many apologies if this is a commonly used term, but it is unfamiliar to me. The word "tier" should be defined early on in the abstract and then in the introduction. I appreciate the authors have included some reference for this towards the end of the first paragraph of the introduction, but is this a biologically determined description of animal society? Or something that is analytical (a human-created category to help illustrate how individuals may assort)?

I am not sure I agree with the point that bird societies have not been studied beyond questions around cooperative breeding. Whilst I appreciate that mammalian study systems are much more common in the literature, focal bird species are also apparent. Flamingos, for example, show very distinct social choices in and out of the breeding season, and their range of assortment patterns illustrates preferences for preferred and avoided engagements with others in their groups. These species of birds also associate by personality type too. I appreciate this work has been completed in captivity, but then so has the work presented here on zebra finches. I think the authors need to reconsider their argument here because managed populations can yield valid and relevant research outputs that help us better understand animal societies.

The studies included in Table 1, are these all from free-living/wild populations?

A very minor point, please check the formatting consistency of scientific names in Table 1 to ensure they are included in italics for all species.

Another minor point, the classification of the zebra has recently changed. The Australian species (the common domestic animal) is now *Taeniopygia castanotis.*

"Birds were tracked after being introduced to unfamiliar members of the opposite sex and studied in mixed-sex colonies (e.g. N=40 males and 40 females)" does this mean that birds were introduced randomly and then this was the mixed-sex colony? Or was the mixed-sex colony formed after this? And why e.g.,? Was the final number of birds in each flock not known?

I have struggled with this definition "equivalent to two halves of a zebra finch body width apart" does this mean that the two birds make up one bird in total? When two finches are sitting side-by-side, how close do they need to be to be determined as being associates? If I am missing something obvious, I apologise!

"...both birds were located on the same perch (i.e. in the same spatial location)." Again, can you clarify please? Birds could be on the same perch but were not associating if they were not within X bird body widths?

Would a figure of how associating birds were defined be useful here? I think this would further clarify this section of the methods.

Were cage/aviary sizes consistent in the study? Did birds have the same environmental features and resource access?

The data analysis is impressive. Some of the terms, as to be expected, are very technical. I wonder whether the introduction could provide some explanation of how the chosen analysis is relevant to the research question/aims of this research? For example, the use of the Horton-Strahler branching ratio, the 'Louvain' algorithm, and the Jenks natural breaks algorithm. Could there be some explanation of how such approaches are used to successfully answer the paper's questions? Rather than stating them and assuming the reader knows why they are appropriate, some context would be helpful.

In the discussion, it is stated that "Previous work in zebra finches found that rates of clumping increased with temperature, suggesting that such behaviour is time-limited." Are there other reasons for this change in clumping? Season, in and out of moult, age? Do zebra finches become less choosy about social partners (clumping with anyone) if the environment becomes less favourable?

The researchers note in their discussion that the higher number of close/strong contacts is to be higher than that seen in other species. They state this may be an artefact of the experimental set-up. How do zebra finches assort in the wild? Has this been investigated? Can the researchers suggest any environmental impacts on social choice that could be unpicked by research on free-living individuals? These birds are opportunistic breeders in the wild, and they live in loose colonies, but they use both roosting and breeding nests for different behaviours. So would there be adaptive benefits to knowing your partners well? Would you get more help during breeding, for resource access, and for huddling together during colder time periods?

It would be helpful to see an overall conclusion from the work. The discussion is fluent, but it does rather "just end." Can you provide a paragraph with a clear take-home message (your main findings) and what their importance is? I feel this would round off the manuscript clearly.

Declarations