Peer Community In Registered Reports

Herring gulls exhibit reduced neophobia when tested in groups

*A recommendation by **Ljerka Ostojic** based on peer reviews by **Claudia Mettke-Hofmann** and 1 anonymous reviewer of the STAGE 2 REPORT:*

Reinoud Allaert, Sophia Knoch, Simon Braem, Dries Debeer, An Martel, Wendt Müller, Eric Stienen, Luc Lens, Frederick Verbruggen (2025) Neophobia across social contexts in juvenile Herring gulls. OSF, ver. 3, peer-reviewed and recommended by Peer Community in Registered Reports. https://osf.io/b58ha

Submitted: 26 November 2024, Recommended: 20 February 2025

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Ostojic, L. (2025) Herring gulls exhibit reduced neophobia when tested in groups. *Peer Community in Registered Reports*, 100956. 10.24072/pci.rr.100956

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How well animals may be able to cope with changes of habitat, specifically with rapid changes and thus novelty they encounter in an environment densely populated by humans, may be influenced by how they respond to novelty in general (Batisteli et al., 2022; Biondi et al., 2024; Castano et al., 2024; Heales et al., 2024). In considering this, it may be important to account for any difference in behavioural responses that animals exhibit when encountering a novel situation alone versus when they are doing so as part of a group. Here, Allaert et al. (2025) tested how neophobia – the fear of unfamiliar objects – is affected by the social context in gulls, birds that are increasingly forced to live in urban environments due to the loss of natural coastlines. In this study, in which they reared herring gulls from egg and tested them taking into account that nestmates are not tested within the same groups, the authors found that the birds were faster to eat and spent more time in the zone of interest when they were tested in a group than when they were tested individually, specifically when a novel object was placed next to the food compared to when that object was a familiar one. The birds were also faster to enter the testing area when tested in a group, but this was not specific to the novel object condition. In addition to these changes in the average responses, the authors also report reduced variance when tested in a group in two of their three measures, namely in the latency to enter the testing area and time spent in the zone of interest. The authors interpret their findings as being mostly in line with the 'risk-dilution' hypothesis, which is often considered in terms of predation risk (Krause & Buxton, 2002). They discuss possible reasons why other studies, with different species and different methodological setups, found support for alternative explanations. The Stage 2 report was evaluated by the same two reviewers who had also reviewed the Stage 1 manuscript. In the revision, the authors focused on adding sex as a factor in their statistical models, which was the planned procedure for the statistical analyses in the Stage 1 report, and adding information

regarding the problems encountered during testing and how these were handled. This specifically refers to the planned sample size (which the authors planned in the Stage 1 report taking into account both mortality and the fact that some birds would be not herring gulls but lesser black-backed gulls, which can only be established after hatching). However, there was higher than expected mortality, leading to a larger-than-planned overall reduction in sample size. During the study, the authors had contacted the recommender and discussed this issue, and the recommender advised on continuing the study and approved of the planned changes in the Stage 2 report. During the revision process, the authors added more information and also conducted an exploratory analysis, which included all birds, i.e. herring gulls and lesser black-backed gulls. This was suggested by a reviewer and the authors present this exploratory analysis in full in the supplemental material, while the main inferences are presented in the main text. In addition, during the Stage 2 review it became apparent that some minor details regarding the procedure would be useful to be included in the Stage 2 report, which the authors included in the Stage 2 revision. This did not alter the procedure as described in the Stage 1 report, but merely added more clarity to the text. Based on detailed engagement with these points and the reviewers' comments, the recommender judged that the manuscript met the Stage 2 criteria and awarded a positive recommendation. **URL to the preregistered Stage 1 protocol:** https://osf.io/u4b7q
Level of bias control achieved: Level 6. *No part of the data or evidence that was used to answer the research question was generated until after IPA.* **List of eligible PCI RR-friendly journals:**

- Peer Community Journal
- PeerJ
- Personality Science
- Royal Society Open Science

References:

1. Allaert, R., Knoch, S., Braem, S., Debeer, D., Martel, A., Müller, W., Stienen, E., Lens, L., & Verbruggen, F. (2025). Neophobia across social contexts in juvenile Herring gulls [Stage 2]. Acceptance of Version 3 by Peer Community in Registered Reports. https://osf.io/b58ha

2. Batisteli, A. F., Pizo, M. A., & Sarmento, H. (2022). Female neophobia predicts the use of buildings as nesting sites in a Neotropical songbird. Animal Behaviour, 183, 151-157. https://doi.org/10.1016/j.anbehav.2021.11.008

3. Biondi, L. M., Medina, A., Bonetti, E. A., Paterlini, C. A., & Bó, M. S. (2024). Cognitive flexibility in a generalist raptor: a comparative analysis along an urbanization gradient. Behavioral Ecology, 35, arae025. https://doi.org/10.1093/beheco/arae025

4. Castano, M. V., Zumpano, F., Biondi, L. M., & García, G. O. (2024). Does urbanization affect behavioral responses to novel objects in marine birds? The Olrog's Gull as a case of study. Urban Ecosystems, 27, 427-437. https://doi.org/10.1007/s11252-023-01465-2

5. Heales, H. E., Flood, N. J., Oud, M. D., Otter, K. A., & Reudink, M. W. (2024). Exploring differences in neophobia and anti-predator behaviour between urban and rural mountain chickadees. Journal of Urban Ecology, 10, juae01. https://doi.org/10.1093/jue/juae014

6. Krause, J. & Ruxton, G. (2002). Living in Groups. Oxford University Press, USA.

Reviews

Evaluation round #2

DOI or URL of the preprint: https://osf.io/prkhu
Version of the preprint: 2

Authors' reply, 18 February 2025

Dear Recommender,

We would like to thank you for the opportunity to revise and resubmit our Stage 2 registered report (RR) entitled "Neophobia across social contexts in juvenile herring gulls".

We appreciate the feedback provided and have addressed both comments raised by the reviewer below and in our revised manuscript.

(i) Blinding of the third coder (L245-246):

Indeed some clarification regarding the blinding procedures for the third coder used to assess inter-rater reliability was missing. We have now included this information in the manuscript. Specifically, double coding was performed by a co-author who was aware of the study's main aims and hypotheses but was blinded to the original coding decisions and the classification of objects (control or novel). The revised text now reads:

"*Video coding was conducted collaboratively by multiple experimenters, with 20 percent of all videos being double-coded by a third experimenter to assess inter-rater-reliability (IRR) using Cohen's Kappa. This third coder was blinded to the original coding decisions and the type of the objects (control or novel), although they were not blind to the overall study aims. Our analysis resulted in a Cohen's Kappa of 0.89, which indicates strong agreement between coders.*"

(ii) Handling of missing sex data (L269-271):

We have clarified our approach for handling missing sex data in the revised manuscript. Specifically, sex was contrast-coded and included as a fixed effect to account for potential differences between males and females. For the two individuals with missing data, a value of 0 was assigned representing the neutral midpoint between the two groups. The updated text now reads as follows:

"*Additionally, sex was contrast-coded, and included as a fixed effect to account for potential differences between males and females. For two individuals with missing data, one where the PCR failed and another where the sample was lost, a value of 0 was assigned.*"

We declare that this revised Stage 2 RR remains original and unpublished. All authors approved the submission of the revised Stage 2 RR in its current form.

On behalf of all authors,
Reinoud Allaert

Download tracked changes file

Decision by Ljerka Ostojic, posted 18 February 2025, validated 18 February 2025

Minor Revision

Dear Reinoud Allaert,

Many thanks for the thorough revision of the Stage 2 report. I have checked all reviewers' comments and your edits in the stage 2 report as well as explanations to the reviewers' comments in the rebuttal letter, and I do not think that a further review is necessary, as all suggestions and comments by the reviewers have been clearly addressed. I would just like to ask you to consider adding two pieces of information into the stage 2 report before I can formally accept it.

The first one refers to lines 245-246, where you talk about the third coder to assess inter-rater reliability - could you add what sort of blinding, if any, is applicable here (was the coder blinded to the main aim of the study, the hypotheses, and/or the coding of the original coders?). Apologies also from my side that I did not ask about this earlier, it has escaped me previously that this information would be useful and valuable to the readers.

The second one refers to lines 269-271, which were added to the stage 2 report during the revision - could you add how the missing data on sex for these two individuals were handled for the analyses?

Many thanks, and I am looking forward to seeing this completed.

All best, Ljerka

Evaluation round #1

DOI or URL of the preprint: https://osf.io/hzxus

Version of the preprint: 1

Authors' reply, 03 February 2025

Dear Recommender, Dear Reviewer,

We would like to thank you for the opportunity to revise and resubmit our Stage 2 registered report (RR), entitled "Neophobia across social contexts in juvenile Herring gulls".

Please find attached our rebuttal letter with point-by-point responses and a file with the tracked changes.

Sincerely,

Reinoud Allaert (on behalf of all authors)

Download author's reply

Download tracked changes file

Decision by Ljerka Ostojic, posted 09 January 2025, validated 10 January 2025

Revision invited

Dear Reinoud Allaert,

I would like to thank you for the patience regarding the decision on the stage 2 report. The stage 2 report has now been seen by both of the original reviewers whose comments you find here. From that, some minor changes are required to the stage 2 report.

As you will see, reviewer 1 has only one comment, regarding an analysis, and reviewer 2 has a list of comments, to which I am providing further information/guidance here.

The first comment by reviewer 2 relates to the exclusion of the lesser black-backed gulls, which was planned in the stage 1 report, but for which you at that stage had anticipated a 10% drop in sample size. Just to provide all information, also for the reviewer, regarding this: You contacted me as the recommender for this report to let me know that you encountered higher than expected mortality and you reported a power analysis for a reduced sample size of 60 inviduals. In the end, the final sample size ended up being 54, as you report in the stage 2 report that there was also a higher than expected proportion of the lesser black-backed gulls. Thus, when looking at the reviewers' comments, the question as to whether presence of the other species could influence results may have been useful for the stage 1 report, and you may want to decide to comment on this

at this stage. You may also want to give more information regarding how many groups had lesser black-backed gulls if you deem it useful.

You will see that some of the other minor questions raised by Reviewer 2 are also questions that refer to the methods section – these points were not raised by the reviewers or me during the stage 1 review, but you may find it useful to add information to this section based on the reviewers' questions (this refers to for example to how much fish was provided on the food plate, and how long the trials were).

Another question refers to the effects of sex, which were part of the table regarding the hypothesis tests. I apologise because it seems that I did not realise previously that this was not included in the Analysis section of the stage 1 report - I think it would be important to provide an answer to this question by reviewer 2 in the stage 2 report, so that the reader has the full information regarding the models reported in the results section.

Reviewed by anonymous reviewer 1, 08 January 2025

This is an interesting, well-written and concise manuscript exploring a very timely research question on differences in neophobia across social contexts in a highly social bird species. The Authors tested 54 juvenile herring gulls, in individual and social context (i.e., in groups of 4-5 individuals, containing no nestmates). The Authors tested three distinct research hypotheses: 'risk dilution', 'negotiation' and 'social conformity', and these hypotheses were accompanied with clear illustrations on the proposed effects. The Authors followed most of the recommendations from the Stage 1 report, and modified some aspects of Methods according to suggestions: in particular, by giving birds more time to habituate to the control objects and changing some of their novel objects. Data analyses followed the Stage 1 plan and were done using adequate statistical techniques. The Authors found that juvenile herring gull neophobia is modified by the social context: individuals tested in groups entered the test apparatus and ate food more quickly, as well as spent more time near the novel objects than when individuals were tested alone. These results give support to the risk-dilution hypothesis, whereby perception of risk is likely shared between the group members. I am looking forward to seeing this manuscript in print. Please see my specific comments as well as copy-edits below, and hope that the Authors will find them helpful.

Specific comments.

One major comment regarding the study design is that two bird species (herring gulls and lesser black-backed gulls) were tested in this study, and the Authors only later in the analyses excluded lesser black-backed gulls from the analyses, which has led to a larger than expected dropout rate (out of the proposed 80 individuals, 54 individuals remained). The Authors do not adequately mention in text to which extent these two species are similar/different, how many of the lesser black-backed gulls were present in each testing group, they do not test for whether and to which extent the presence of lesser black-backed gulls during the tests influenced behaviour of the herring gulls, they also do not mention or argue how this mixed-species composition could have influenced the results. Could the Authors give some information on this? It would also be beneficial to provide some statistical comparisons between groups with different species composition.

How much food (stacked fish) was provided in the food plate (L208)?

What was the length of the trial – was it ten minutes or until the bird first touched the food?

Table 1. Did the Authors measure all times that the animals spend within the zone of interest overall (also after the food was touched), or just how long the animal spent in ZOI before it first started eating?

Details on sex ratios and sex analyses that are mentioned in the supplementary material are missing from the manuscript. In the Stage 1 report it was mentioned that sex will be considered in the statistical analyses, but I could not find any mention of these analyses. Could you provide more detail on this? Was there any sex effect?

Abstract should include more methodological details like the number of tested individuals.

The authors use some abbreviations that are not explained on their first mention in the text. For instance, what is "RM" and "cor." in line 127-129? Please check for other such abbreviations in text too.

Copy-Edits.

L9. "to establish reproducibility" -> "to establish repeatability"

L9. "individuals in groups" -> "individuals tested in groups"

L11. It is somewhat unclear what is meant by "by distributing it among group members". Please rephrase.

L30. Delete "which we used in the present study" as this aspect should only be mentioned later in text.

L33, L60. Delete "DM" and "TR"

L35. The Authors could also cite a new preprint by ManyBirds et al. Evolutionary drivers of neophobia across the avian clade. https://doi.org/10.31219/osf.io/qhy8m

L43-44. It would be good to support this sentence with some references.

L55. "causing them to behave more similarly" does not follow logically from the sentence, please clarify further as was done in L67-68.

L90, L155. Add a comma after "Indeed" and "Upon arrival.

L167, L175. It is unclear whether birds were housed in groups of eight to ten or all were housed in groups of ten, as different information is provided.

L176. Following my previous comment, did any measures differ between the groups of different sizes?

L277-279. Could you provide more details on how the contrasts were calculated?

L280-281. Why is it mentioned that these results are in the main manuscript?

L306. Like it has been clarified for "object", please clarify what is meant by "context" in brackets.

L320. One "figure" is redundant.

L332. Close the second bracket after indicating the p-value.

L353-354. It would be good to add "in groups" after "reduced variance" for clarity.

L359. I would remove brackets for latency to eat, as it is a part of the main findings.

L361. Add "when in group" after "level of threat".

L363. As we cannot be sure what the birds truly perceive, I would suggest staying more cautious by adding "likely".

L368, L393. Please delete "as discussed in Introduction" and add relevant references instead.

L387. I would delete "thus" as this sentence does not follow from previous one, and add "our" before "results".

L414. Please add "that" after "note".

L427. Delete a period before the brackets.

L431. As this study can be found as a pre-print, it would be better to cite it as such.

L449-450. It would be better to not keep a subchapter that contains just template words "these are your appendices".

References still need some work. For instance, it is not needed to include both the doi and eprint (e.g. 507-508, L636-637, L648-649), Latin names of species should be in italic (e.g. L510), ISBN number are not needed (L621), and issue/volume/page numbers are needed (e.g. L504).

L702. Sampling plan: Add a period after "novel object".

Reviewed by Claudia Mettke-Hofmann, 05 December 2024

This stage 2 manuscript follows the introduction and methodological protocol outlined and approved in stage 1 and any deviations (e.g. sample size) are justified and documented. Quality checks were performed and when necessary, transformations conducted.

Results are well presented with effects of both factors (context and object) and their interactions showing indicating that the lower sample size did not hamper detection of significant differences. The discussion centres around the questions proposed in stage 1 and the respective outcomes. The conclusion is based on the evidence provided.

Overall, this is a very nice and interesting study that is well presented.

I have only one comment (see below).

Comments:

Methods:

Lines 143-145: shouldn't it be within subject factors rather than within species factors for the repeated measure?