

Response to reviewers

Dear Dr. Veissier,

Thank you for the thoughtful and constructive comments on our manuscript ‘Goats who stare at video screens – assessing behavioural responses of goats towards images of familiar and unfamiliar con- and heterospecifics’. As requested, we have revised the manuscript, taking carefully into account all comments. Together with this revision note, we have resubmitted a revised version of the manuscript with all changes highlighted.

We hope that the present version of the manuscript has improved significantly and that you might consider this manuscript to be recommended by *PCI Animal Science*.

The material in this manuscript has not been published elsewhere and is not submitted for publication elsewhere. All authors have seen the final manuscript and we all take responsibility for its contents.

Sincerely,

Jana Deutsch, Steve Lebing, Anja Eggert & Christian Nawroth

Goats who stare at video screens – assessing behavioural responses of goats towards images of familiar and unfamiliar con- and heterospecifics

Editor Comments to Author:

Dear authors,

I thank you for providing a revising version of your manuscript and explaining changes in an accompanying letter.

I thank you for shortening the introduction and discussion and for making them more to the point, and for addressing the reviewers' comments. There are still some points that need to be considered.

Author's response: Thank you for your feedback.

Answers to Reviewer 1

You provide answers in the response letter but did not necessarily change the manuscript. It is important to address reviewers' comments also in the manuscript, namely:

- justification of female should also be in manuscript

Author's response: We decided to include this as part of the discussion as there is no justification of only using females, it was solely a limitation at our research institute.

L. 608-610: "Finally, a more diverse study population (larger age range, more than one sex tested, etc.) will help to make more generalizable statements about social visual preferences in goats."

- The explanation on previous positive human contacts that you provided to Rev 1 ('feeding them with dry pasta, if possible touching and petting them) on a regular basis (once a day, five days per week) ') should be in text

Author's response: Amended.

L. 265-268: "Familiar humans had almost daily positive interactions with the animals (feeding them with dry pasta, if possible touching and gently stroking them) during the habituation phase over at least three months (once a day, five days per week)."

- The fact that you already observed that goats differentiate geometrical stimuli could be added in discussion, maybe in § from L 465

Author's response: Due to the feedback that we should shorten the discussion, we decided that we don't want to include the previous pilot study in this manuscript. Additionally, we did not find that they differentiate between different geometrical stimuli, we found that they pay attention to geometrical stimuli

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presented on the video screens (similar to the results presented in this manuscript).

- Potential interference due to social relationship: to be added in discussion

Author's response: We added this to the discussion.

L. 604-608 "Assessing the social relationships between the subjects in their home environment, such as dominance rank or the distribution of affiliative interactions, could carry additional information when explaining potential biases or preferences in subjects' looking duration and should be considered in future studies."

Answers to Reviewer 2

Again some answers are provided only in the letter. Please add information in the manuscript. Below are the points in your letter that should also be mentioned in manuscript:

- Screen height: 'Subjects standing in front of the apparatus were considered to look approximately at the centre of the screens'

Author's response: Amended.

L. 205-206: "Subjects standing in front of the apparatus were considered to look approximately at the centre of the screens."

- The start of the data collection was adjusted individually for each session based on the behaviour of each subject. When the goat entered the testing area, approached the apparatus and was standing relatively calmly in front of it, the session was started. Sometimes, individual subjects first explored the testing area before approaching the apparatus which led to a delay in starting the session.

Author's response: Thanks for flagging this. We already provide this information in the manuscript and hope that the level of detail provided is sufficient for the readership (see. L. 299-301, 307-309).

- As at least one motivational trial alternated with a test trial, the four stimuli of one session were presented with a break between stimuli presentation of at least 10 seconds.

Author's response: We now make clear that both, motivational and test trials, lasted for 10 seconds and therefore the break between two test trials (as they

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alternated with the motivational trials, mentioned in L. 306) was at least 10 seconds.

L. 301-303: “Prior to the stimulus presentation, one to two motivational trials were conducted in which a food item was inserted into the apparatus without any stimulus being presented for 10 seconds afterwards.”

- Coding the videos frame-by-frame enabled us to put the single frames into the course of ear movements. Using similar coding criteria for ear positions in a follow-up study had very high inter-observer agreement, further supporting the feasibility of our ethogram using a frontal camera.

--> please provide figures on reliability (from that previous experiment)

Author’s response: A second observer now re-coded 11% of the videos with regard to the duration of ears in the respective positions so that we are now able to report parameters for inter-observer agreement for our study in the manuscript.

L. 361-363: Inter-observer reliability for the duration of ears in the respective positions was found to be high (32 out of 305 trials (11%) of the videos were coded by two observers; Pearson correlation coefficient (r) = 0.85; $p < 0.001$).

Additional points

L452: replace ‘they’ by ‘goats’

Author’s response: Amended.

L. 457-460: “In this study, we tested whether a looking time paradigm can be used to answer questions on recognition capacities in dwarf goats, in this case whether goats are capable of recognising familiar and unfamiliar con- and heterospecific faces when being presented as two-dimensional images.”

L460 and 461: use the same verb tense (could not and were’ or cannot and are’ (if you want to make a general statement)

Author’s response: Amended.

L. 464-468: “However, their response did not differ between familiar and unfamiliar individuals (irrespective of species), suggesting that goats either cannot spontaneously assign social recognition categories to 2D images or are equally motivated to pay close attention to both categories (but for different reasons).”

L536 – 537: your hypothesis is only on goats since you have not tested other species à replace non-human animal (in this case goats)’ by ‘goats’

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Author's response: We now made this clearer in all three hypotheses and changed the respective wording in the introduction and discussion part.

L.126-128: "We hypothesised that goats attribute their visual attention to suddenly appearing objects in their environment (H1)."

L.130-132: "Moreover, we hypothesised that goats show different behavioural responses to two-dimensional images of conspecific compared to images of heterospecific faces, irrespective of familiarity (H2)."

L.139-142: "We also hypothesised that goats are able to spontaneously recognise familiar and unfamiliar con- and heterospecifics when being presented with their faces as two-dimensional images (H3)."

L.471-473: "As predicted (P1), goats paid more attention to a video screen presenting a stimulus (S+) compared to a white screen (S-), supporting our hypothesis that goats attribute their visual attention to suddenly appearing objects in their environment (H1)."

L.478-481: "As predicted (P2), subjects paid more attention to goat compared to human faces, supporting our hypothesis that goats show different behavioural responses to two-dimensional images of conspecific compared to heterospecific faces, irrespective of familiarity (H2)."

L. 541-543: "Consequently, we have to reject the hypothesis that goats are able to spontaneously recognise familiar and unfamiliar con- and heterospecifics when being presented with their faces as two-dimensional images (H3)."

Author contribution: SL contributed only to data curation and investigation. It is essential that author contribute to the writing of the paper and agree with its content.

Author's response: SL has commented and edited the first drafts of the manuscript. We therefore decided to add this as additional author contribution. SL also agrees with the content of the current version of the manuscript.