

Authors' reply to the review of Reviewer 3

Thank you for your effort spent on reviewing and commenting our manuscript. We have replied to your comments below, in Calibri, bold face text.

Overall, we have followed your recommendations and we have added more information to the section on cognition, created a separate section for affective state and aimed to make the structure more unique. The previous similarity in structure with the paper by Marino 2016 was purely accidental and not at all intentional, as we have had several different structures of our paper throughout. The similarity in starting with reviewing sensory abilities makes logical sense and is intuitive to have prior to other aspects, thus we have kept this structure. Other aspects should now not be similar, whenever not intuitive to follow similar structure. We hope that this has improved in the revised manuscript.

Line numbers stated refers to the numbers of the revised manuscript, i.e. the manuscript with track changes still intact.

Best wishes,

Hanne Lovlie, Laura Garnham

Review Report Form

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- ☒ I would not like to sign my review report
☐ I would like to sign my review report

English language and style

- ☐ Extensive editing of English language and style required
☐ Moderate English changes required
☒ English language and style are fine/minor spell check required
☐ I don't feel qualified to judge about the English language and style

	Yes	Can be improved	Must be improved	Not applicable
Does the introduction provide sufficient background and include all relevant references?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the research design appropriate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are the methods adequately described?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are the results clearly presented?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are the conclusions supported by the results?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments and Suggestions for Authors

This manuscript provides an overview on complex behaviour and cognition in the fowl. The aim of this review is an important one, i.e. to increase the readers' awareness and consideration of the fowl by bringing to attention the huge set of experimental results obtained about this species in the last 30-40 years. This is particularly relevant when considering that the fowl is the most abundant production animal, a species subject to intensive farming and - too often - to poor welfare conditions.

We are pleased to see that the reviewer shares our interest for the topic and supports our view on the need for a review of it.

The manuscript is well written (I detected only some minor text editing issues, e.g. line 161 "se" instead of "see"; line 337 understanding "of" the sensory....; line 369 "not depend not") and the evidence reported is correctly and clearly described, although often quite superficially, especially for what concerns the section on sensory ability and on cognition.

Thank you. We are pleased to hear that you find our text clearly written. Regarding the spelling mistakes, these have now been amended. We did however keep 'per se' as this is Latin (i.e. not English). We agree with you that some sections are not going into details and have aimed to add more detail to several of these, however, we do not aim to review again what has been well reviewed by the recent reviews (mainly Nicol 2015, Pizzari 2016, Marino 2016) and hope this has become clearer in the revised version of the manuscript.

My main concern regards the fact that this review in its current state is too similar in structure and content to the recent review published on the same topic by Lori Marino (Animal Cognition, 2017). If a reader has already had the chance to read the Marino's article, he/she would find this reading pretty much of a duplicate. Moreover some of the issues - as mentioned above - are tackled at a more superficial-generic level. The part on sensory abilities is too similar to Marino's paper and it is disappointingly succinte, same holds true for the section on complex cognition. There are notable exceptions though: the parts dealing with sexual selection, personality, and welfare implications.

I therefore recommend the authors to revise this article and extending those parts by providing more detailed information, and in general to allocate much more attention to the most recent literature, which is not present in Marino's paper.

Thank you for your comments and advise on how to expand our work. Our overview is to a large extent based on Nicol (2015), Pizzari (2016) and Marino (2016). The similarity in structure to Marino was not intended or in any way copied, as we have had various suggested structures while drafting this manuscript. The presentation of senses prior to cognitive abilities does make intuitive sense, and we have thus kept this. To present visual senses first again make intuitive sense due to it being the seemingly primary sense of the fowl. We have therefore felt obliged to keep this similarity in structure to prior work (it does have similar structure to also Nicol's book in this aspect, due to its intuitive sense). The structure has however been changed for the current version of the paper and more detail added to the sections on sensory ability and cognition. The extension on sensory

biology is less so compared to cognition, since sensory biology was not the main aim of our overview and merely need to be reviewed to better understand the complex behaviour and cognition of the fowl. We have also included information from more recent publications to bring the manuscript more up to date, as suggested by the Reviewer.

The domestic chicken has been extensively studied also with regard to topics which are not at all considered in the present paper (nor are they mentioned in Marino's review) such as brain lateralisation, face perception (starting from Morton and Johnson's seminal paper) and the neurobiology of learning and memory (investigating mechanisms of learning such as filial imprinting or passive avoidance). These are just some suggestions for the authors in order to enrich and individuate their paper by broadening sections which do not overlap with the existing general review literature.

We again appreciate the effort by the Reviewer to improve our work and thank the Reviewer for these suggestions. We have followed the suggestions by the reviewer and have now included information on facial recognition, imprinting, passive avoidance learning, brain lateralisation, and declarative memory and added more detail to the cognition section overall (lines 379-598).

Other issues:

Much of the discussion on cognitive abilities (pages 6 and 7) is actually dealing with affective and emotional behaviour rather than proper cognition. I wonder if it would be worth to have a separate section dealing with those issues.

We agree and following the suggestion of the Reviewer, the information on affective state can now be found in a separate section (lines 339-376).

Also, please check the referencing throughout as it seems that there are some mis-quotations (e.g. line 311 ref. 94, and possibly others). References number 73 and 104 are incomplete.

Thank you. The Reviewer is correct, there were mistakes in the references of the previous version of the manuscript. We have aimed to carefully double checked our references in the revised version of the manuscript.

When discussing the implications for welfare, please provide evidence-based advise, or, if claims are not evidence-based this should be clearly stated (e.g. lines 341-42 about artificial light; or lines 351-353 on social learning of feather pecking).

In the revised version of the manuscript, the text has now been gone through and, for any discussion of welfare implications, we have aimed to be clearer in whether the advice is evidence based or not.

Concerning welfare implications, maybe some information on the actual legislation and on its historical evolution to accommodate scientific evidence on chickens' behaviour would be of some interest to the readers.

We agree that this may be interest to some readers, thank you for the suggestion.

However, our paper has moved from being intended to be part of a special issue on welfare and cognition, to a general submission. As a result of this, our aims have changed slightly (lines 79-92) and we have now toned down our focus on welfare. Therefore, we feel that discussing legislation and evolution of welfare would fall outside of the current scope.

line 305: I believe "perceptually filling in" is more correct than the current expression "mentally filling in".

Thank you, this has been amended.

Submission Date: 01 October 2017, Date of this review: 03 Dec 2017 22:13:00