**The effects of prenatal corticosterone and thermal environment on numerical discrimination abilities in a lizard.**

Recio et al. 2024

DCL Comments

**Major Comments (Content)**

Ln 33: What is “numerousness” here?

Ln 104: What are “skills” here?

Ln 133: You should add a brief description of Weber’s law or its predictions. I don’t want to stop reading your paper to go look at Agrillo and Bisazza 2014.

Ln 175: You’ll need to change this sentence (and some other spots) to represent the fact that a) you’re only using one species in this study and b) this data is only from L. delicata.

Ln 198-200: I’m not sure what you mean by “represented by a different system”, but it sounds important.

Ln 207-215: I found this chunk confusing, but I don’t have any great suggestions on how to fix it. The figure helps a little, so maybe moving it closer is one thing that could help, especially because it’s not referenced again after this paragraph.

Ln 223-226: I think I know what you mean here - that no matter what they chose, you recorded time spent with both options simultaneously (i.e., the one they didn’t choose would be 0 minutes) - but it’s a little unclear. Consider revising.

Ln 226-228: This is also a bit confusing. I wonder if it would be better to have a simple table that’s like “Behaviour Measured, Description, How it’s Calculated” or something. If you can make the change suggested in Minor Comments - Ln 218-222, you could add this information in those bullet points instead, which might help.

Ln 298-300: Is this method really a reliable indicator of natural behaviour? You have them in stark white boxes climbing plastic platforms to eat frozen piles of crickets covered in nutrient supplements. I don’t doubt the method is reliable for testing numerical discrimination, but I question if you can really call it natural; I also don’t know what is meant by “acquirement of ecological issues related to numerousness and quantity discrimination”.

Ln 307: I think I know what is meant by “select the most appropriate quantity”, but I also don’t know why this would even be the assumption. I would think animals, unless there were some very clear cost associated with more numerous prey items, would almost always go for the maximum possible and just eat whatever they could. You go on to mention this in the following sentence, but I think it’s a bit strange to even mention the handling costs possibly influencing results when there definitely aren’t handling costs in your experimental design. Maybe perceived handling costs? But I sort of doubt it.

Ln 341-374: I really like these paragraphs. I think both should be front loaded into your discussion and save the “well here’s the shit part about these kinds of tests” for just before your conclusion where you make the case of “Here’s why what we have is cool, but here’s how it could be done better”. It sells the story more to me. Also, your conclusion is good.

**Minor Comments (Editorial)**

Ln 22-24: Suggest combining to one sentence.

Ln 24-27: Suggest combining to one sentence.

Ln 27: adition -> addition

Ln 28: Add “it” before “essential”

Ln 31: Suggest removing “common” from “common garden skink” to avoid confusion with the concept of “common garden” experiments.

Ln 32: Add “the” before “CORT” and make “temperature” into “temperatures”

Ln 34: differen -> different

Ln 34-35: May be good to rephrase to include “each” in a few places to clarify that each animal received each test.

Ln 36: constraint -> constrain

Ln 39: does -> do

Ln 41: Significant -> Significance

Ln 47: Suggest changing “incubation” to “developmental”, or explicitly specifying “developmental stress hormones and incubation temperatures”

Ln 52: Suggest changing “numerical” to “quantitative” to be consistent with other instances of this idea.

Ln 55: Remove “between more and fewer” because this is redundant.

Ln 57: Suggest removing “considered” for a stronger punch.

Ln 59-62: It seems weird to me to specify the example of lions, but not provide taxa for the other examples/citations.

Ln 65: Suggest removing “and paradigms” because it seems redundant (maybe not?); paradigmas -> paradigms.

Ln 66: Is “Numerical competences are” the correct way to phrase this? Are there multiple types of numerical competence? Or would it be more correct to say “Numerical competence is” and make the rest of the sentence singular?

Ln 69: later -> latter

Ln 75: Add “An” before “animal’s” OR make plural “animals’ brains are”.

Ln 78: Suggest changing “the response to stressors” to “the physiological stress response”.

Ln 80 and elsewhere: Recommend including citations after each relevant example, rather than as one big list at the end of the sentence.

Ln 82: Put “Farrell et al. (2015)” in parentheses.

Ln 84: Change “thermal early environment” to “early thermal environment” or “embryonic thermal environment”.

Ln 87: shark -> sharks; “elevated-temperatures” to “elevated temperatures” or “high temperatures”

Ln 100: “Competent in numbers” sounds weird to me. Maybe “competent in numerical discrimination” is better?

Ln 102: Suggest changing “big and small food quantities” to “large and small quantities of food”.

Ln 105: Formatting error with species name.

Ln 110: Inded -> Indeed; Suggest changing “the literature evidences” to “the literature shows evidence for”.

Ln 111: Suggest adding “the” before “test employed”.

Ln 112: Suggest removing “At the same time” and adding “also” before “be”.

Ln 113-117: Suggest “For example, incubating lizards at high temperatures improves cognitive abilities, consistent with increased neuronal density in some areas of the brain, but impairs cognition at temperatures above lizards’ natural incubation thermal range.”

Ln 117: Formatting error on Abayarathna and Webb (2020) citation.

Ln 119: tipically -> typically

Ln 120: Recommend adding “on cognition” after “thermal environment”

Ln 122: concentration -> concentrations

Ln 122-124: Suggest either adding “(CORT-treated or a sham control)” after “manipulating CORT concentration” OR removing the “(Cold - 23°C…” after “temperature regimes”.

Ln 123 and elsewhere: Formatting error on all instances of °C.

Ln 126: “Based in” -> “Based on”; effect -> effects; suggest removing “cognitive” and adding “on cognition” before “in reptiles and other taxa”

Ln 136: “And/or” to “or” - “or” can be inclusive

Ln 138: Husbandry -> Animal Husbandry

Ln 139: out -> our

Ln 140: Remove “and” before “L. guichenoti”

Ln 143: Recommend merging the post semi-colon section about feeding with the following sentence.

Methods: Make sure all of methods is in the past tense, i.e. consists -> consisted, are -> were, and so on.

Ln 148: Eggs -> Egg

Ln 149-151: Starting at “inside”, suggest instead “…on the hot side of each communal enclosure to provide females with a place to lay eggs.”

Ln 154: “a individual” -> “an individual” OR removing this chunk about identity altogether, because I think it can be reasonably assumed you know who each individual is.

Ln 156: Suggest changing “parts” to “grams” or “g”

Ln 157: “Cling wrap” -> “Plastic wrap”

Ln 157-158: Suggest “Incubators at two different temperatures” -> “Incubators (LATWIT 2X5D-R1160) programmed to two different thermal regimes…”

Ln 162: Suggest adding “(± 1 mm)” after “nearest mm”; Suggest “…and weighed them on a digital scale (OHAUS, Model spx123) to the nearest gram (± 0.001 g).”

Ln 164: Suggest changing “sprayed” to “provided”.

Ln 170: Add “CORT” or “developmental stress” before “treatments”.

Ln 171: Suggest supplied -> applied

Ln 172: Take vehicle out of parentheses; Suggest “at a final concentration of 10 pg CORT/mL”.

Ln 173: Add “100% ethanol” before “vehicle”

Ln 176: “This temperatures” -> “These temperatures”

Ln 176-178: Add “for this species” after “natural incubation temperatures”

Ln 179: Remove “in both species” since you only use one.

Ln 181: experimen -> experiment

Ln 182 + Ln 189: acclimatation -> acclimation

Ln 184: “one of the extremes” -> “one side”

Ln 191: You say “provided each day” elsewhere when referring to watering schedule, but “ad libitum” here. It’s not a big deal, but you should be consistent.

Ln 192: Probably the same as the temperature gradients before, but after “temperature gradient” add “(24-32°C)”.

Ln 194-215: This paragraph is long. Consider breaking up into two paragraphs, perhaps at Ln 202?

Ln 195: where -> were; number -> numbers

Ln 198: For just the “1 VS 4” recommend “1 cricket VS 4 crickets”

Ln 200: in -> of

Ln 201: Suggest “small, frozen crickets” instead

Ln 202: multivitamin -> multivitamins

Ln 202-203: Suggest “We used frozen crickets to avoid movements which could affect lizards’ behaviour or ability to discriminate among quantities.”

Ln 203-204: Suggest “Lizards were fed frozen crickets for one month prior to experiments to habituate them to eating frozen prey.”

Ln 204-207: Suggest “To habituate lizards to the experimental conditions, frozen crickets were placed on top of one of the platforms and Petri dishes during each feeding for two weeks prior to experimental trials.”

Ln 216: Use military time (i.e., 1000-1200 hours) instead

Ln 218-222: If allowed by the journal, recommend making this a pop-out list instead of inline sentences.

Ln 241: Add Oxford comma after “(Cold versus Hot)”

Ln 243: indentity -> identity

Ln 247: Probably should add a citation for use of Pmcmc as a metric of significance.

Ln 252: thermorregulation -> thermoregulation

Ln 254: five-seven -> 5-7 OR five to seven

Ln 259: human-ending point (lol, me after a bad day) -> humane endpoint

Ln 262-263: Recommend moving the stats for each respective response variable to right after the name of said response variable, i.e. “We detected an effect of age (X = 0.357 ± 0.004, Pmcmc = 0.001) and sex (X = …”; Would also recommend splitting up age and sex results into different sentences so it’s easier to follow.

Ln 270: Recommend rephrasing as “Neither temperature, CORT, nor their interaction contrasts affected performance in any of the tests, nor were there any clear patterns suggestive of an effect of the developmental environment on numerical discrimination.”

Table 1 (caption): Recommend changing from “meanHot” to X̄hot

Table 1 (table): If it’s not too hard or problematic, I recommend including “(Hot - Cold)” and so on underneath the respective Predictors.

Discussion: Suggest including an introductory sentence to recap what your experiment was before jumping into “Our results show X”

Ln 286-296: Very Results-y to me. I personally would change this to be in more layperson terminology, but it’s up to you.

Ln 302: key-role -> key role

Ln 303: where -> in which

Ln 304: based exclusively in those where -> based exclusively on those trials in which

Ln 306: “are based on the assumption that” -> “assume”

Ln 320: simoultaneously -> simultaneously

Ln 321: Recommend splitting the sentence at “, and,”

Ln 324: type -> types

Ln 327: I don’t like calling them “successful” studies here, but I know what you mean.

Ln 329-333: The way it’s phrased, the Podarcis example feels a little out of nowhere. I don’t think you need another sentence or anything, just to rephrase this one to be like “However, in one such study on Podarcis…” or something; Are the Miletto Petrazzini et al. 2017 citations the same paper? If so, why cite it twice back to back in the same sentence instead of just the second time?

Ln 338: use -> using

Ln 341-351: I think this paragraph should be way higher up in the discussion. Possibly as part of the first paragraph, even.

Ln 361: Suggest changing “researchers” to “Nieder (2005), Cantlon et al. (2009), and Hyde (2011)”

Ln 370: relying in -> relying on; type -> types

Ln 371: rather than -> other than