“Female brain size affects the assessment of male attractiveness during mate choice”
(in guppy females at least)

Corral-Lopez et l
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Question and experimental design

- two lines of females: large brain and small brain
    - previously shown to diverge in cognitive abilities
    - no differences in swimming performance or condition index
    - evidence for advantages of small brains, such as better immune response, faster early juvenile growth, and higher fecundity .
- given option between attractive and unattractive males(average wild type preferences)

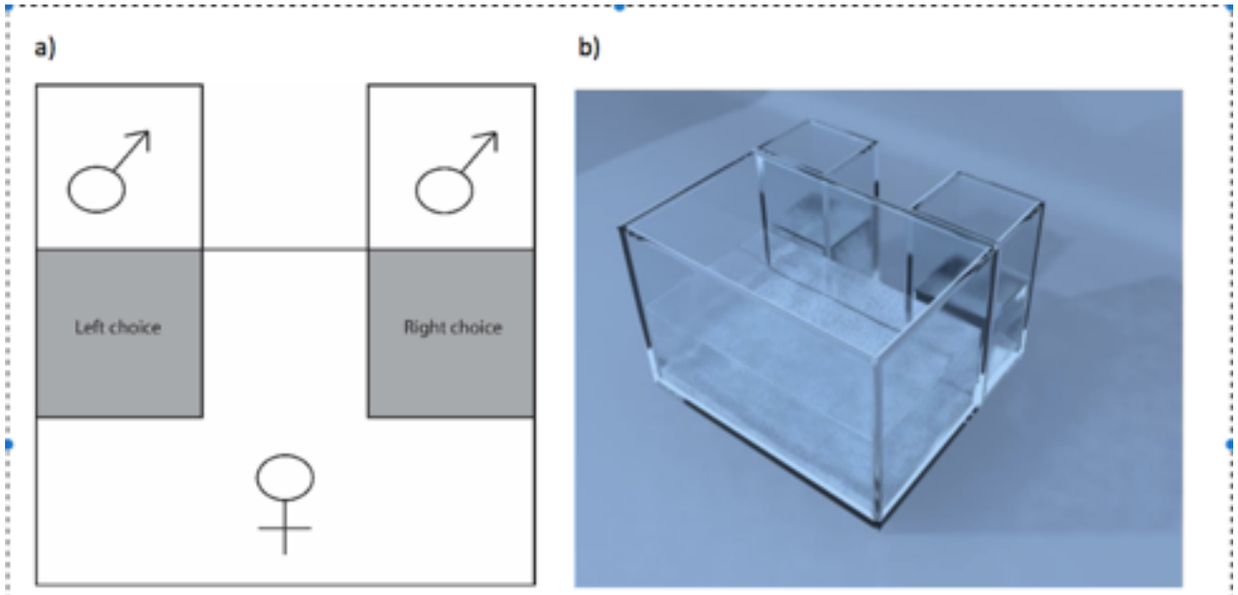


fig. S4. Schematics of experimental setup used in preference tests. Top view (**a**) and 3d view (**b**) schematics of the experimental set-up used with large-brained, small-brained and wild-type females for dichotomous choice tests between attractive and non-attractive males.Grey shaded areas represent the area of the tank in which a female was considered to associate with each male.

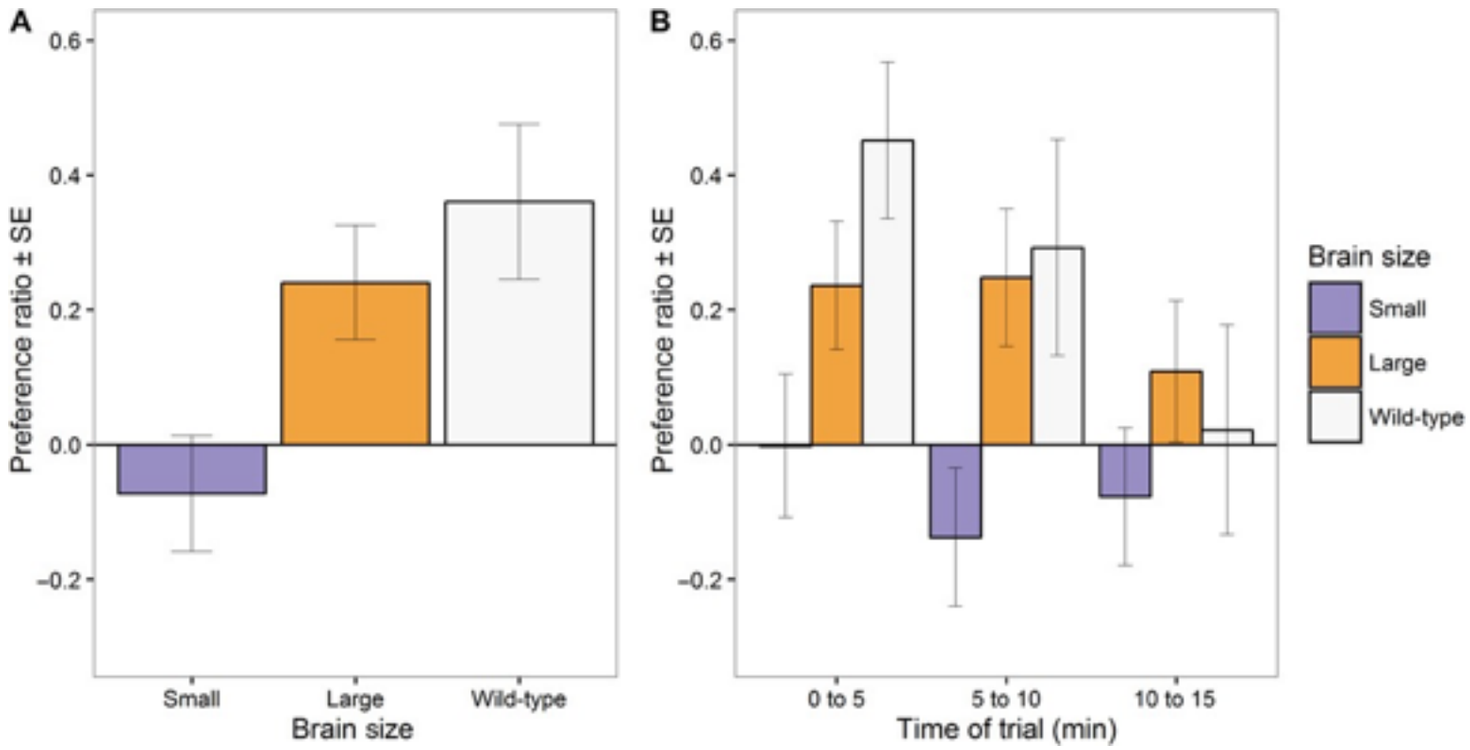
Guppy mating behaviour and preferences

- polyandry: females mate with multiple males.
- female guppies delay the development of a brood when the anticipated second mate is more attractive than the first male
- they prefer a novel male to the original male or a brother of the original male with similar phenotypes
- what is an attractive male?
    - brightly coloured,larger tail; traits linked to fitness and foraging ability;
    - courtship behaviour: physical strength is needed in maintaining the courtship dance, called sigmoid display, in which the males flex their bodies into an S shape and vibrate rapidly.
    - social influence: females might copy other females' preferences

https://www.youtube.com/watch?v=HOnCobaIZng

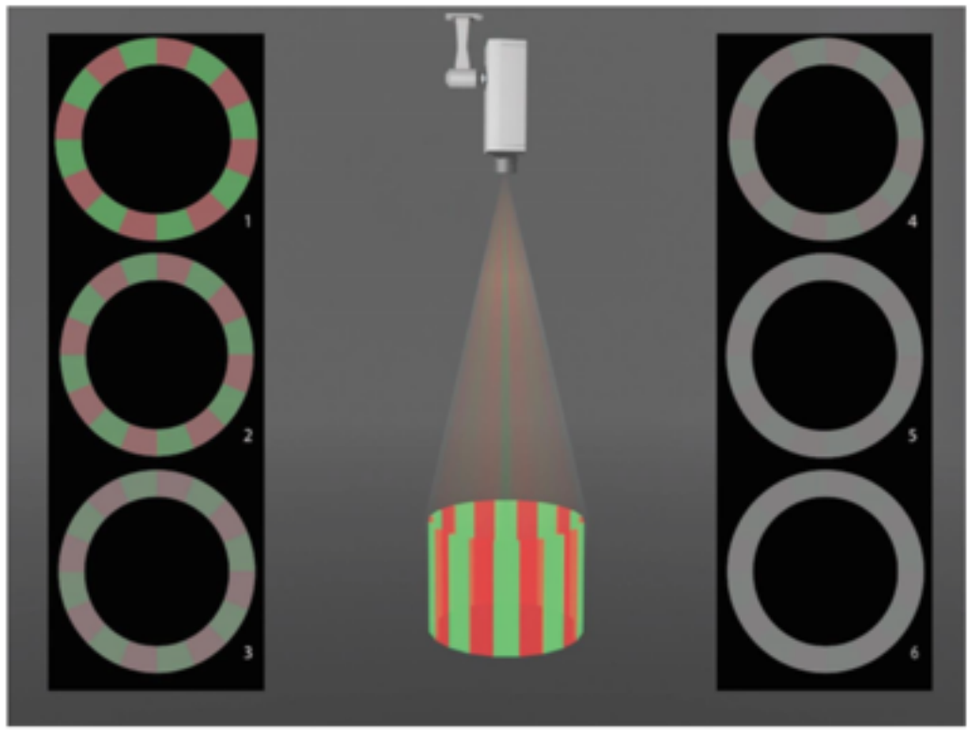
Results

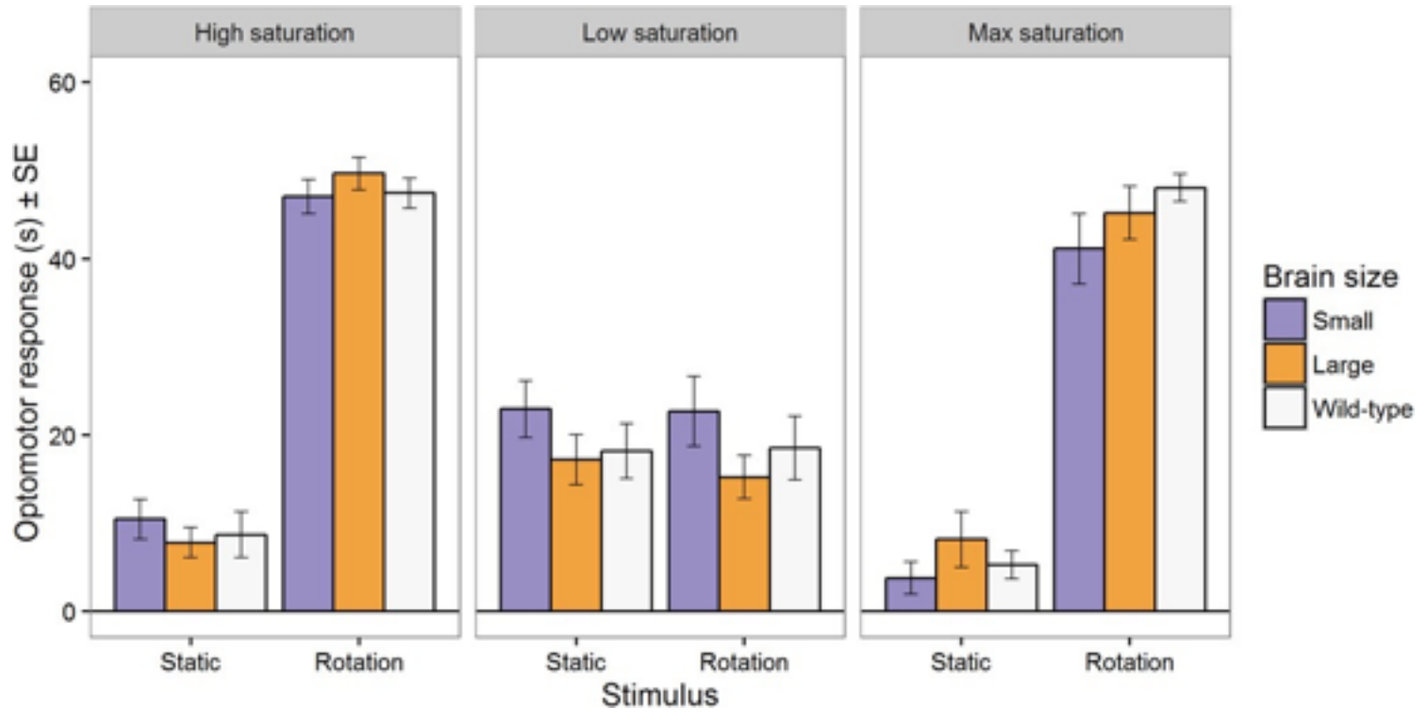
- measure preference by time spent near the attractive vs unattractive male
- large brain and wild types prefer attractive males
- small brain indifferent (as a group)
- BUT
  - equal times spent in viewing areas
  - equal levels of partner preference(distributed indifferently between attractive and unattractive males for small brain lines)
  - equal time spent out of choice areas



- no difference in colour perception

- no difference in opsin expression





Conclusions

- differences in mate preference cannot be explained by
    - differences in perceptual abilities
    - differences in motivation
    - difference in search strategy
    - previous experience (all females had been raised similarly; isolated from males prior to the experiment)
- cognitive constraints:
    - females could not see both males simultaneously