Problem-solving males become more attractive to female budgerigars

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2025.07.18

浙江大学
生命演化研究中心

SEXUAL SELECTION

Problem-solving males become more attractive to female budgerigars

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PERSPECTIVE | EVOLUTIONARY BIOLOGY

Are clever males preferred as mates?

Testing this Darwinian hypothesis is a tough nut to crack

虎皮鹦鹉

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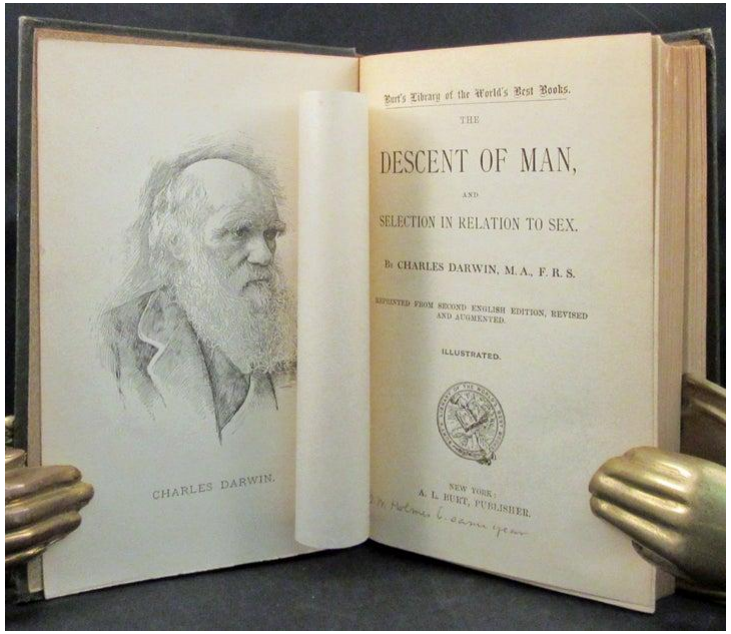
Brid behaviour and cognition
Ecology and evolution of forest birds

Sexual selection

Evolution: Natural selection, Mutation, Genetic drift, Gene flow, Sexual selection

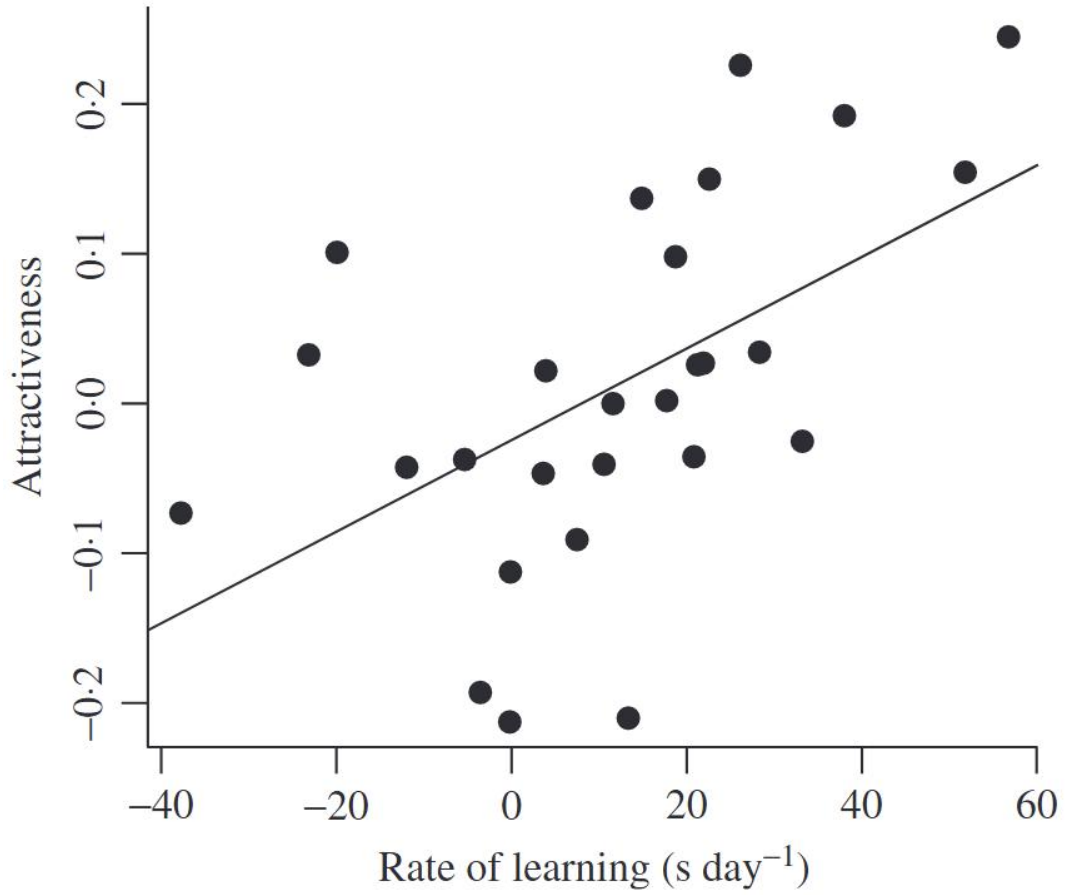


Sexual selection may have contributed to human evolution.

Mating with a “smart” partner can give rise to immediate benefits, such as obtaining a partner with enhanced food extraction abilities or one that is better at coping with varying environmental conditions

The Descent of Man, and Selection in Relation to Sex
《人类的由来及性选择》，1871

Correlation between cognitive ability and attractiveness



10.1111/j.1095-8649.2009.02366.x

Mate choice for cognitive ability

Object: Budgerigars（虎皮鹦鹉）

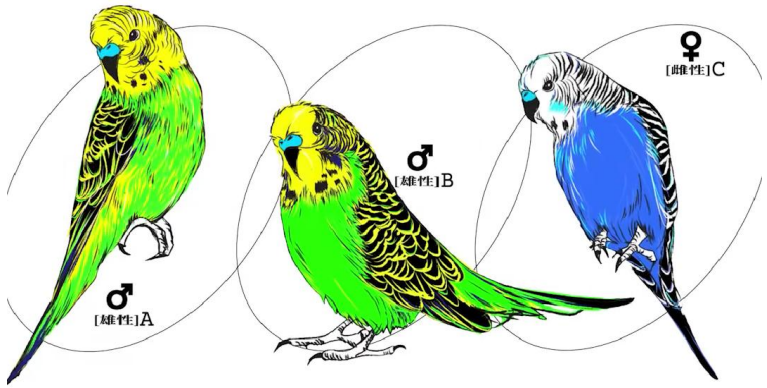
Features:
1) Detailed studies of the food extraction skills that budgerigars need in these conditions are lacking, but finding and extracting food can be challenging, and thus having cognitive skills for accessing food is likely adaptive.
2) Moreover, because female budgerigars incubate, brood, and feed their young babies after hatching, while male mates provide food for the females, finding a partner with the skills to solve foraging problems is advantageous.

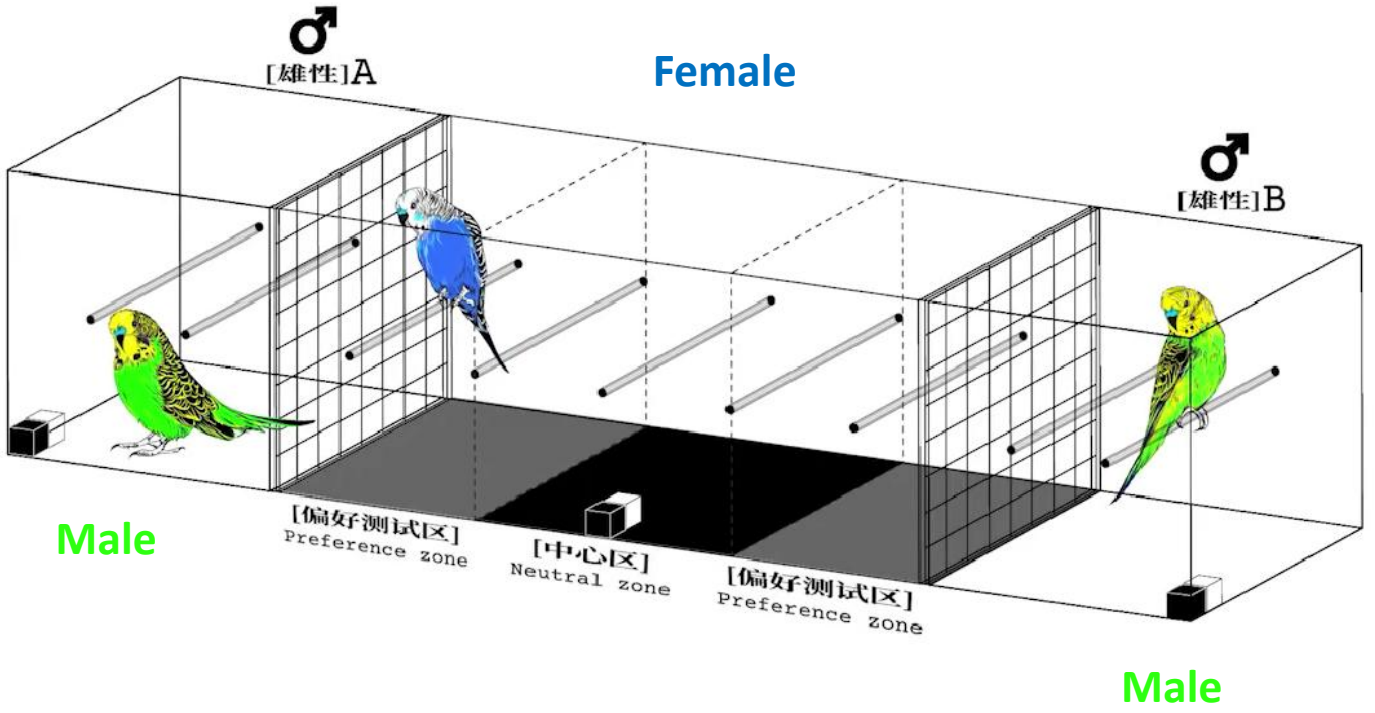
Hypothsis: Females attend to and prefer males that show cognitive skills in extracting food

Preference test 1

- The male near which the female spent most of her time was identified as the preferred male (P-male) and the other one the less-preferred male (LP-male).

9 groups (biological replicates)
Each group: 1 female and 2 males





Cartoon from “论文研究所”

Preference test 1

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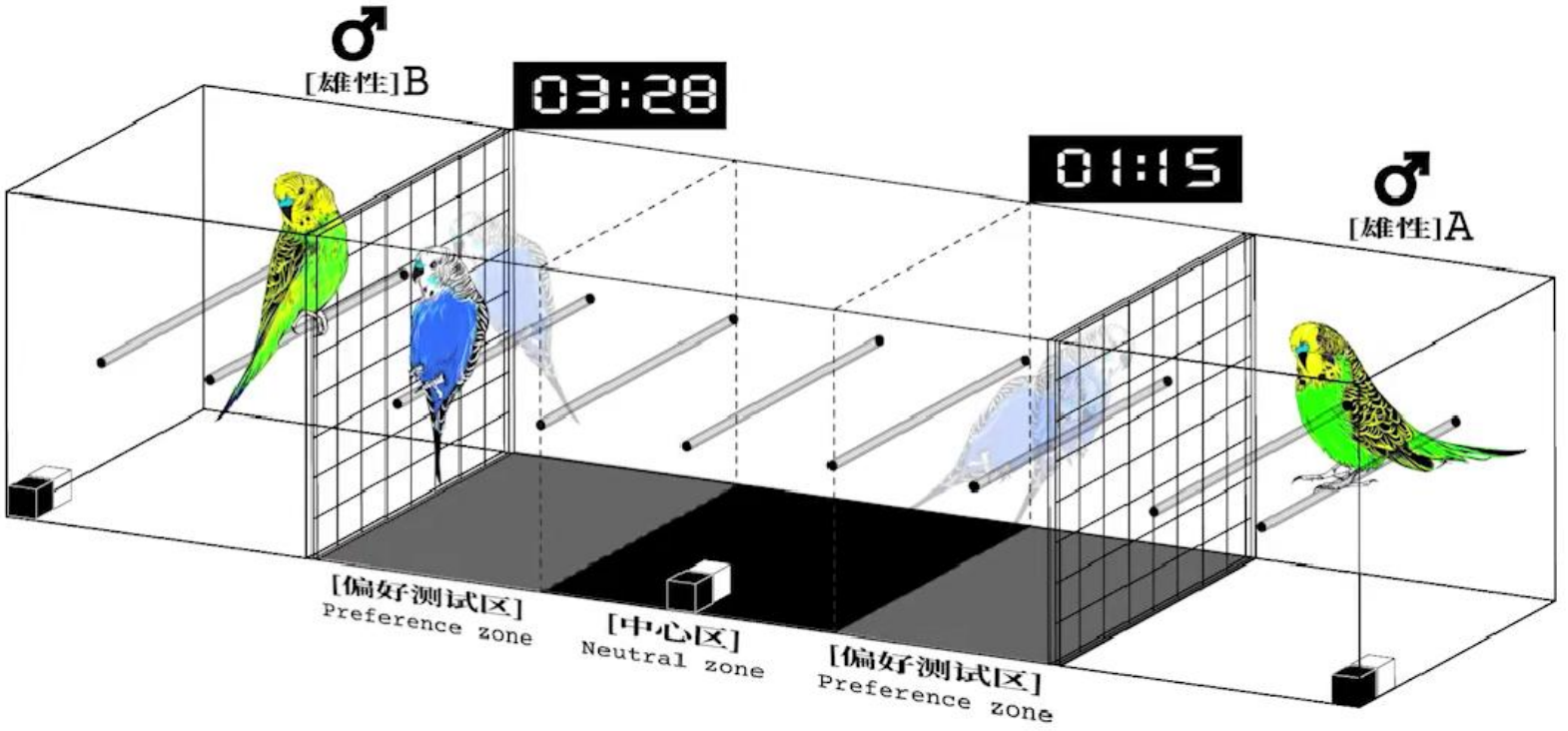
Preferred male



Less-preferred male

Then we can calculate the time the female spend in each preference zone. And the male with whom the female spent more time in the preference zone was designated as her primary mate choice, preferred male. The another male is less-preferred male.

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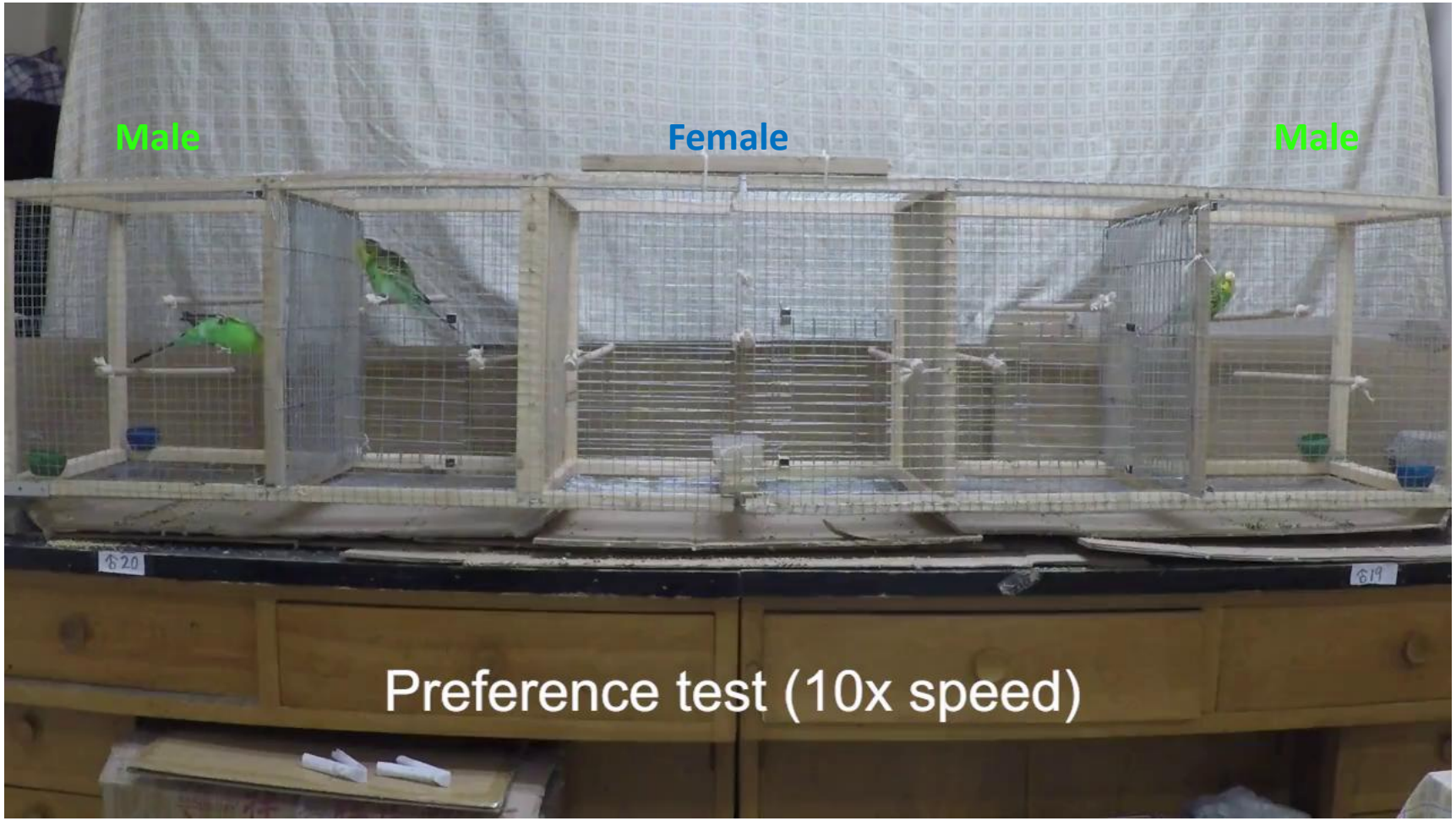

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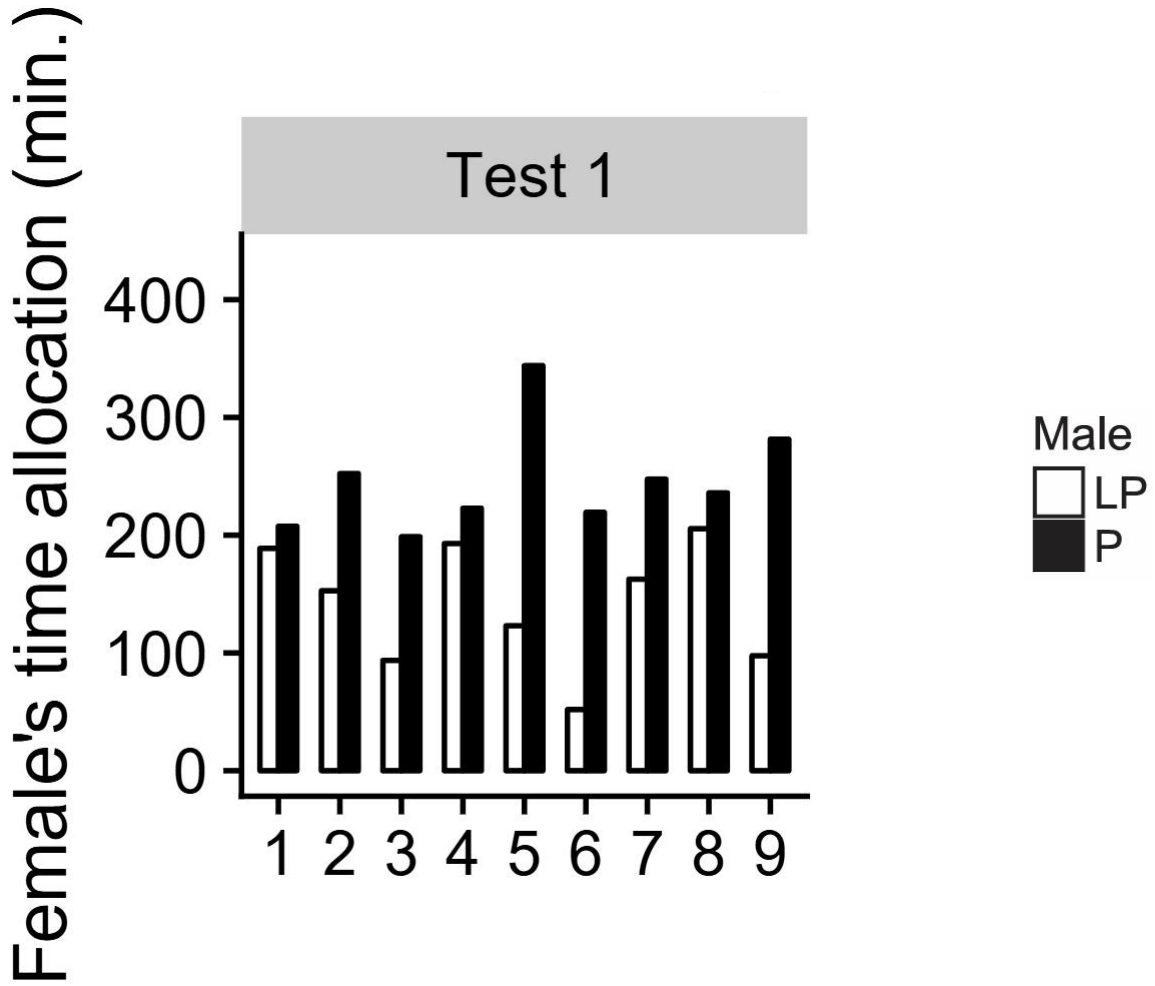
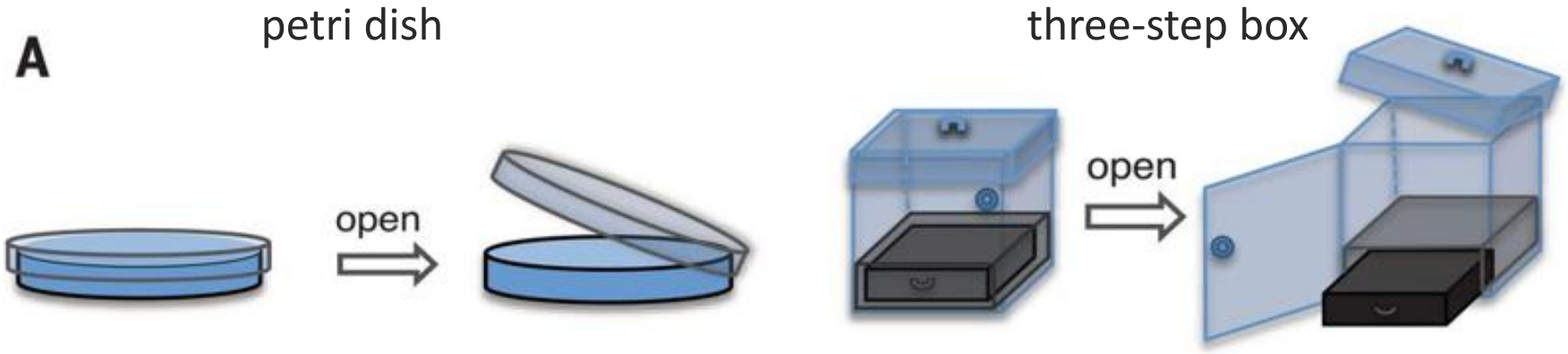


Preference test 2

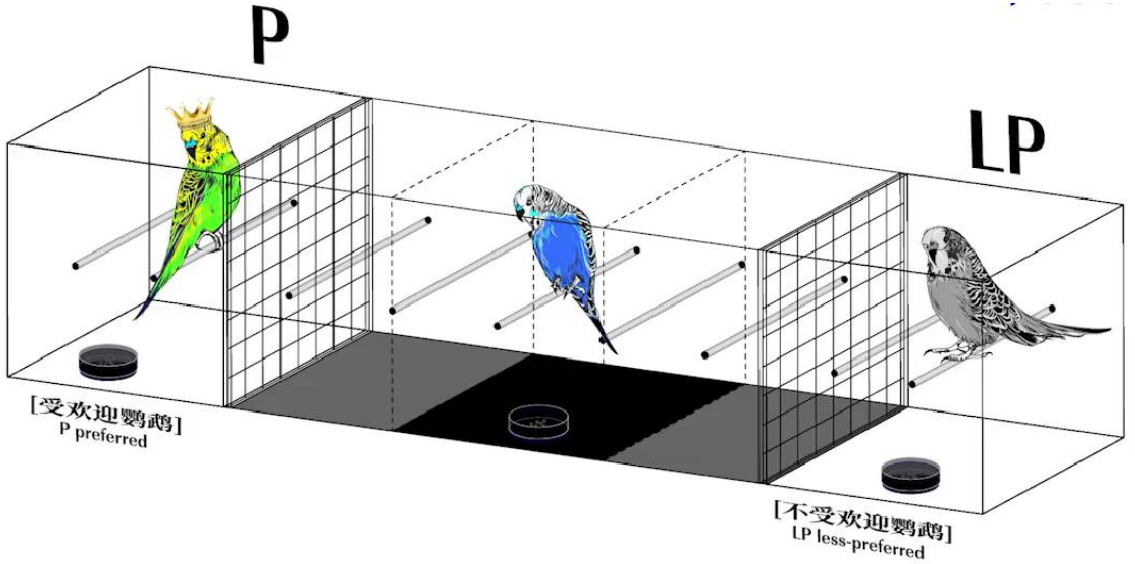
- Less-preferred males of the problem-solving group were trained to solve two foraging problems to get access to food—opening a petri dish and opening a three-step box.

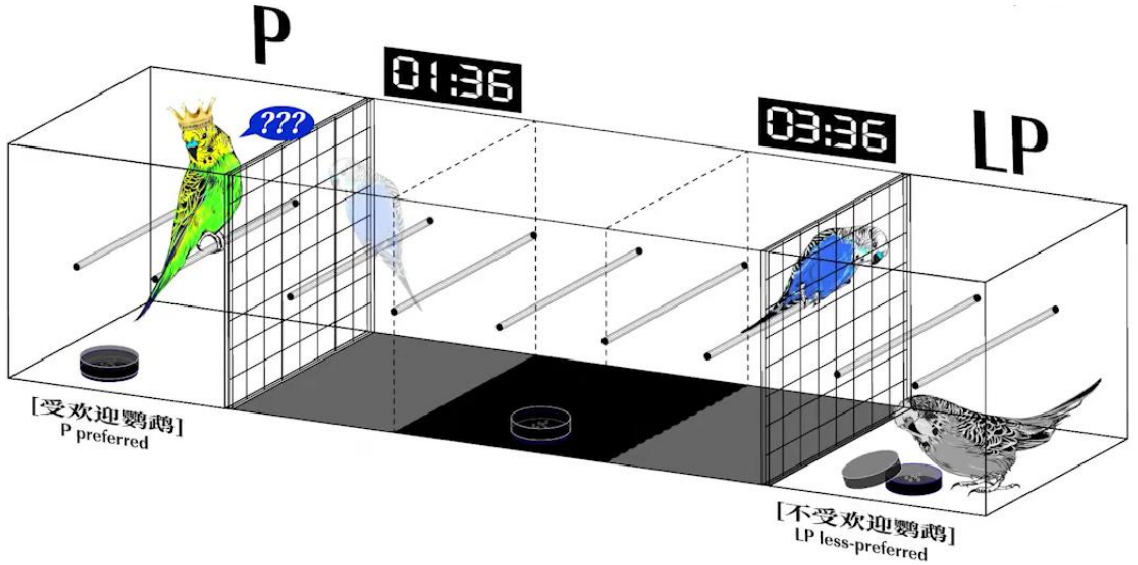
- All 9 less-preferred males, but none of the preferred males, successfully opened the petri dish and the three-step box in front of the females. And did preference test2.

Less-preferred male

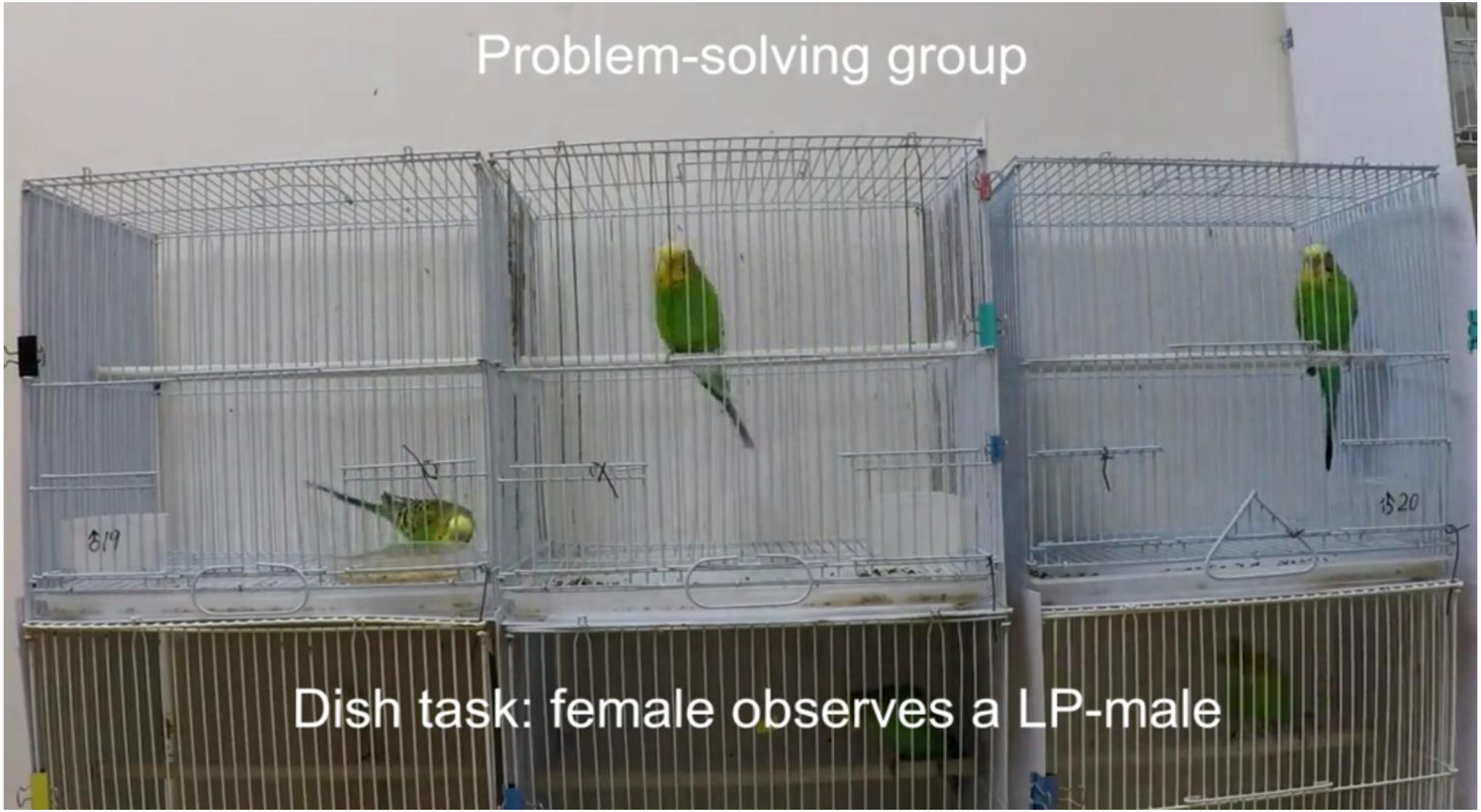


Preference test 2



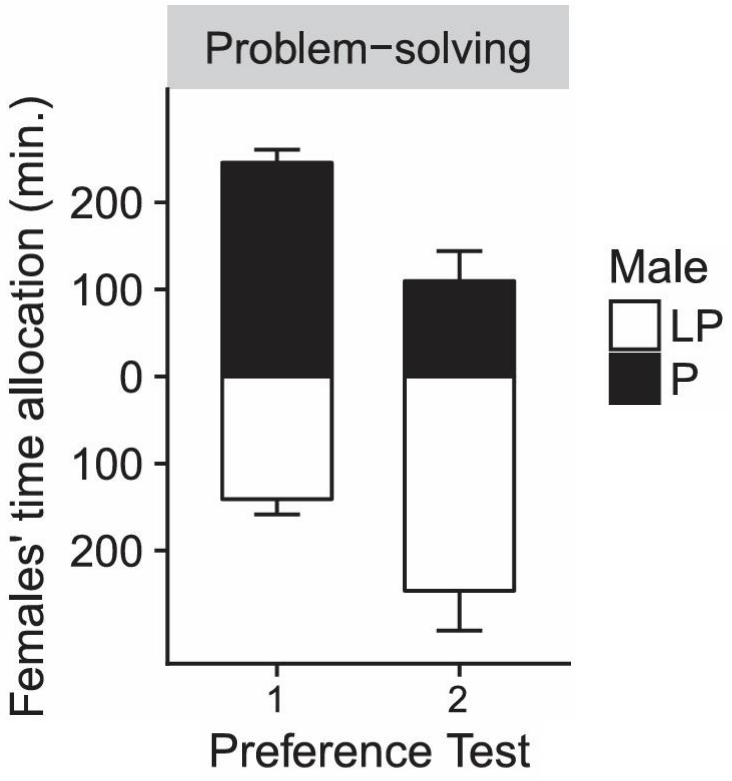


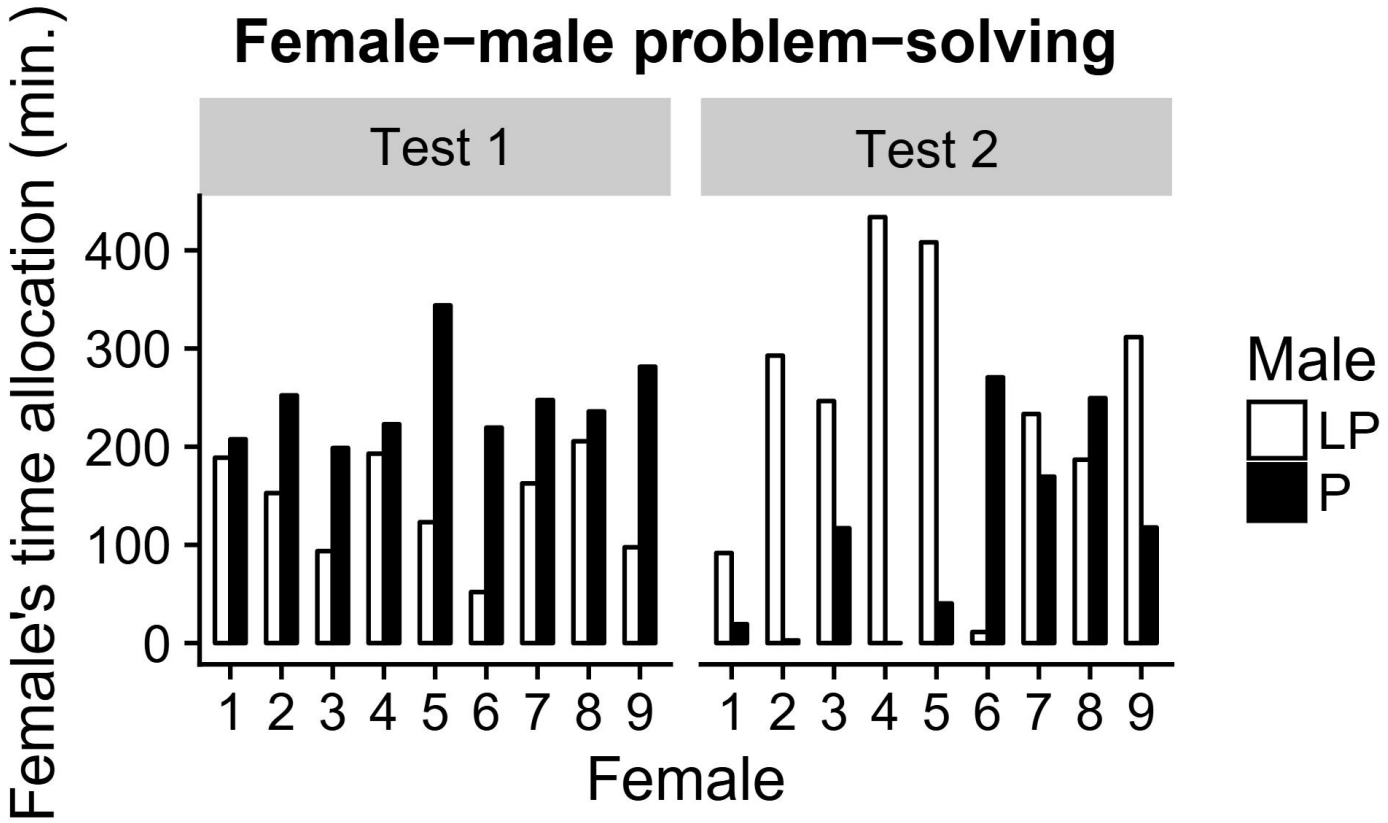
Preference test 2



Preference test 2

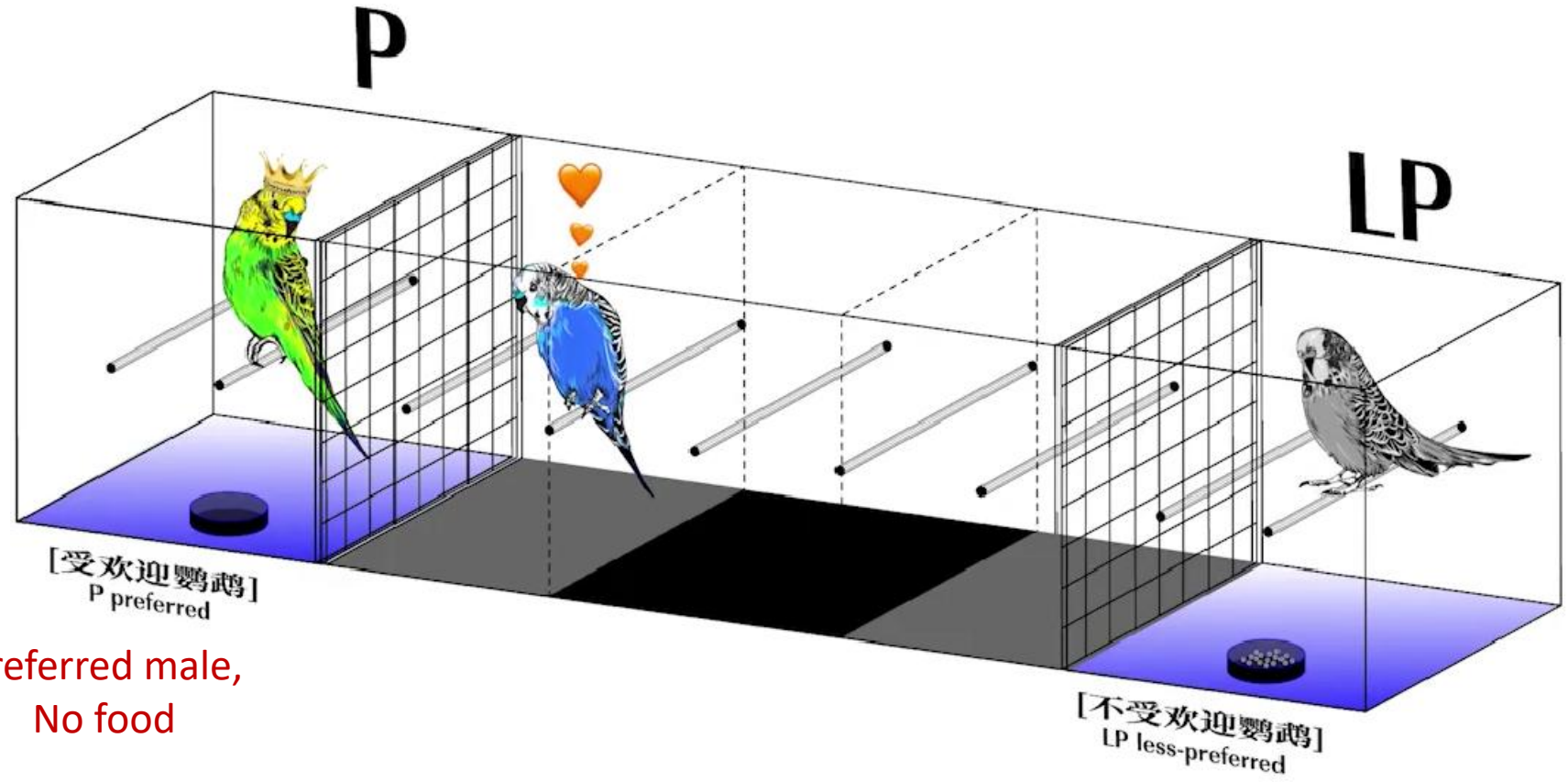
- The time allocated to the less-preferred males was significantly higher than that allocated to the preferred males during preference test 2





Control group

- Control for the effect of food per se on preference



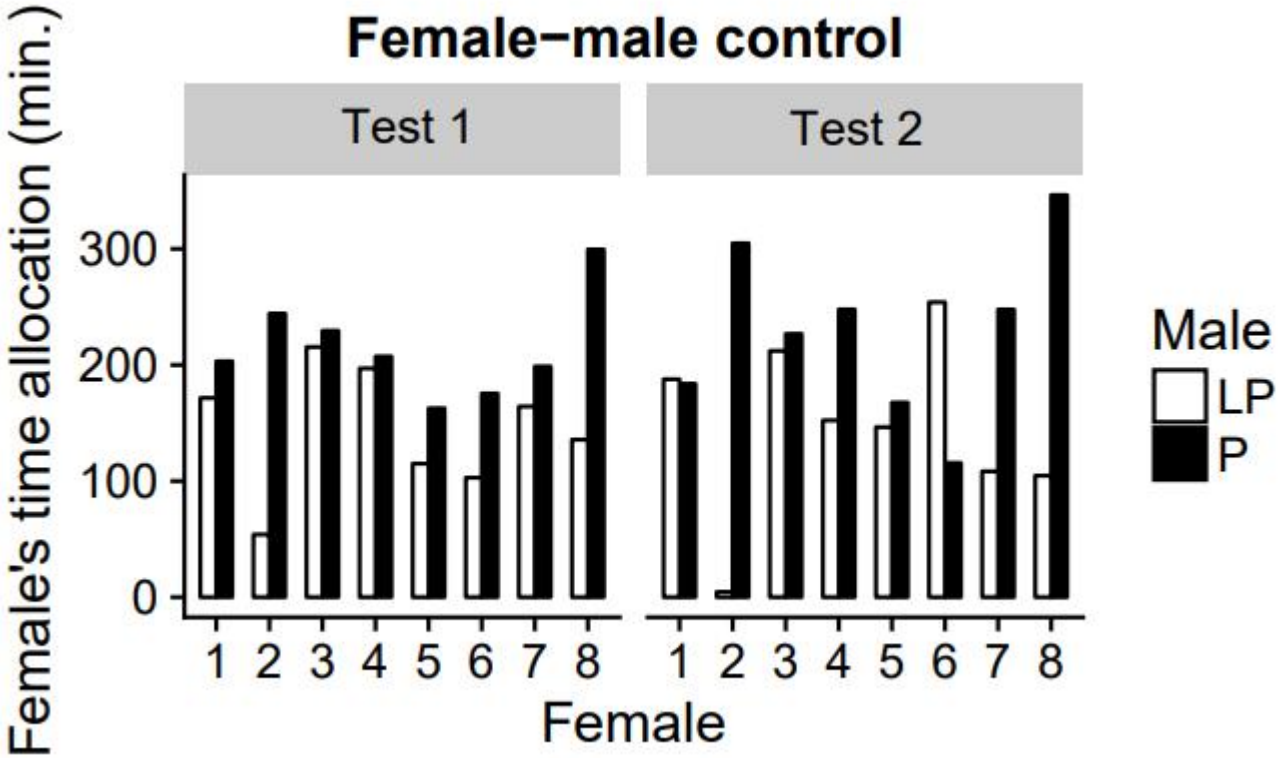
Preferred male,
No food

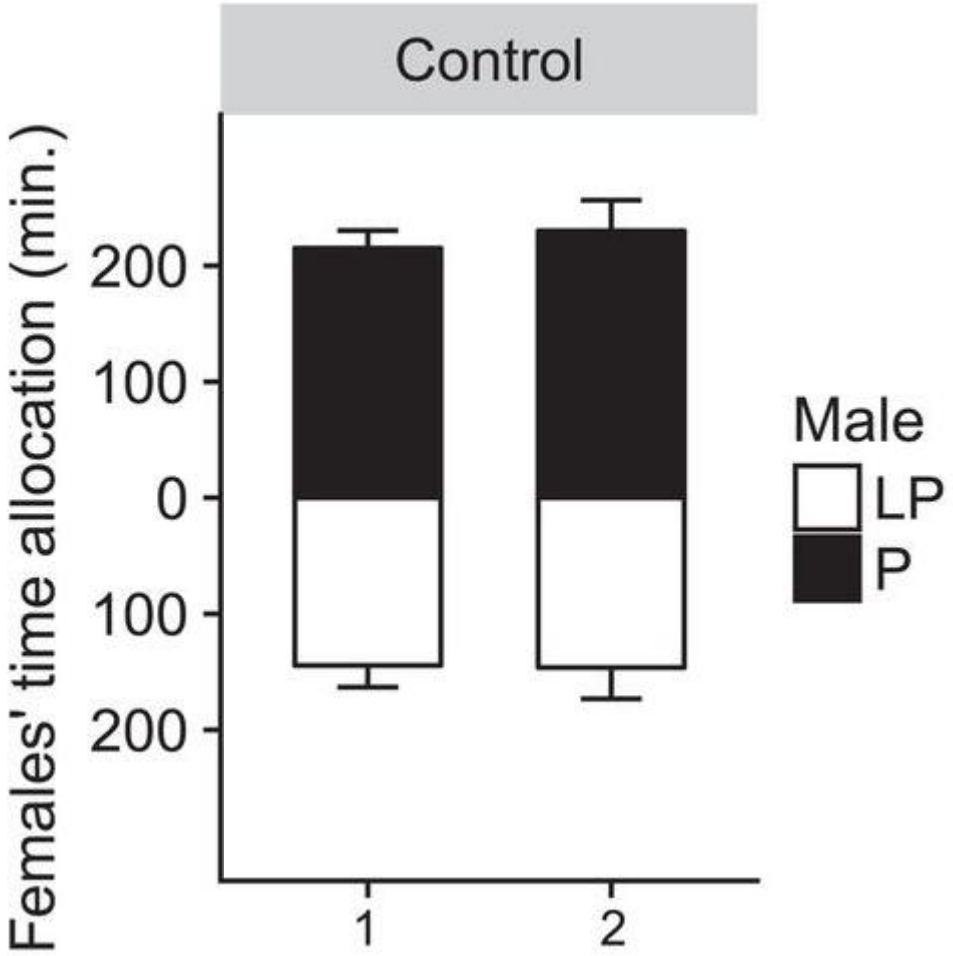
Less-Preferred male,
Open petri dish with food

In the observing phase for the control group, females saw the less-preferred male having free access to food in a regular food container and the preferred male having no food

Control group

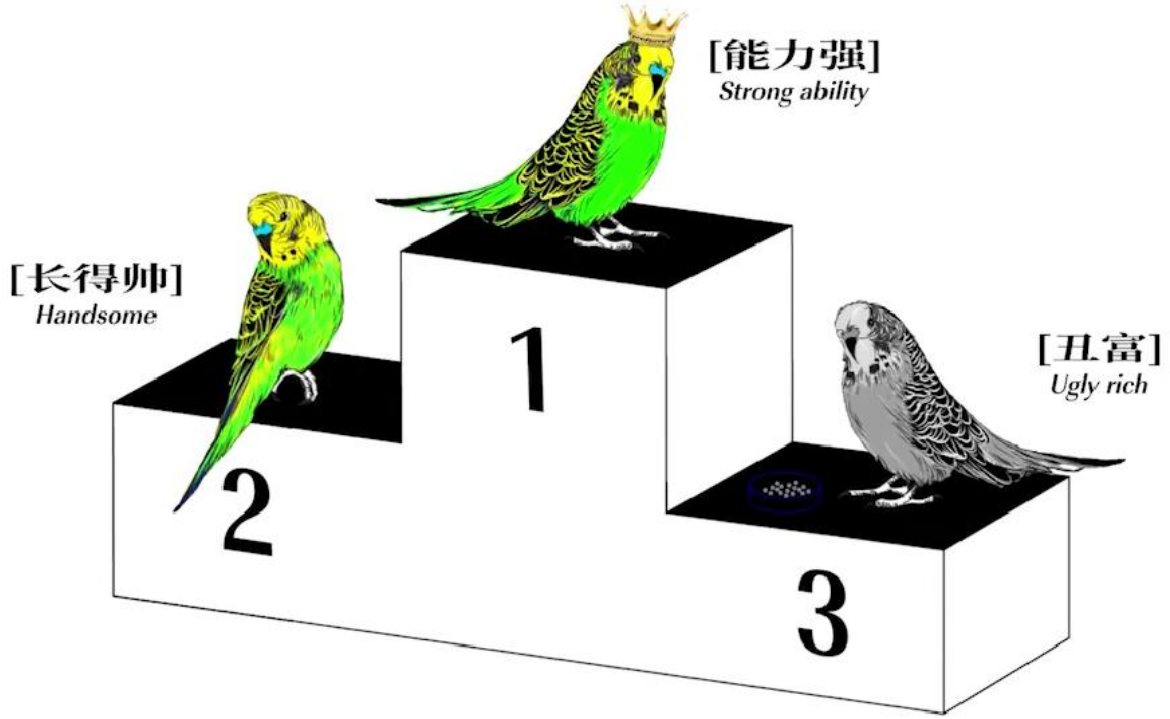
- The difference in time allocation to both males did not change.





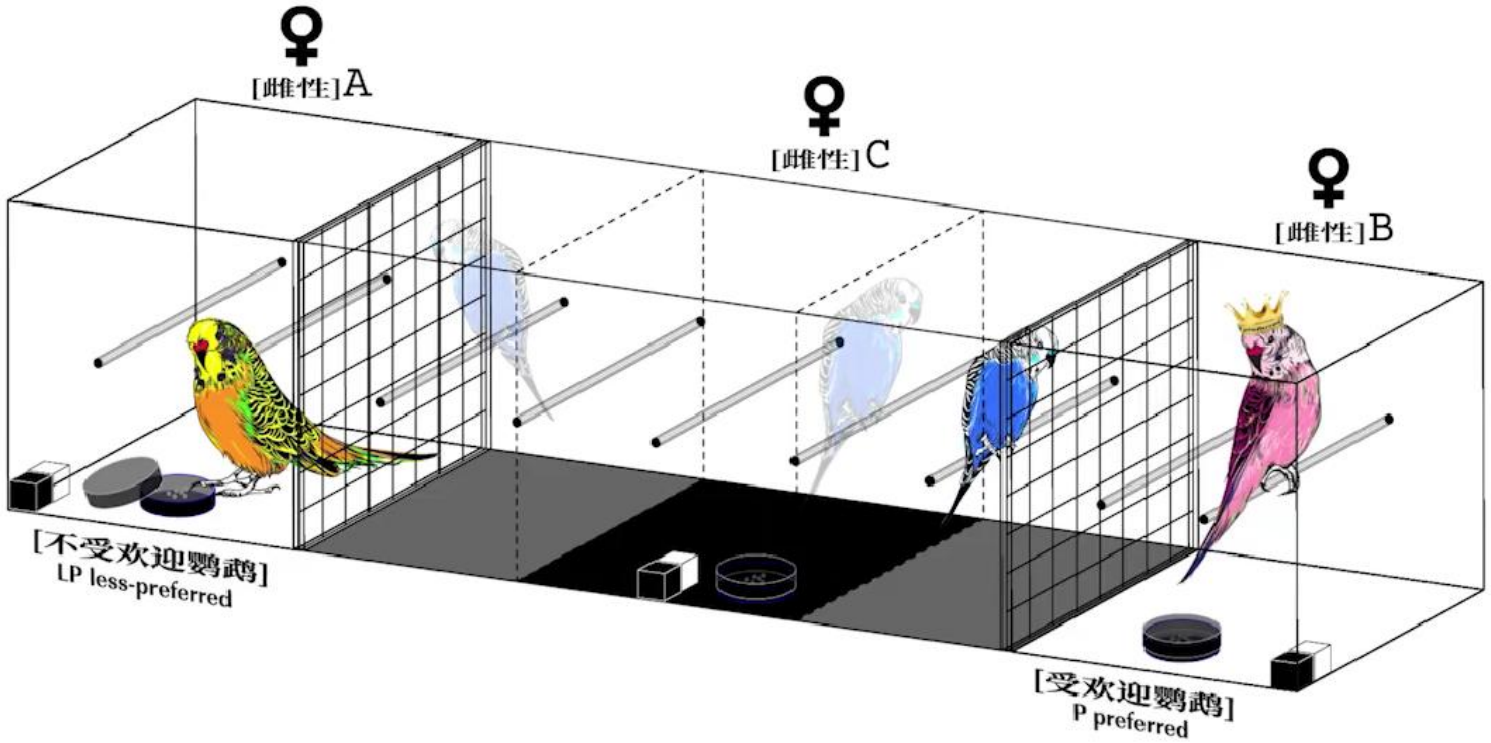
It’s the cognitive ability to get food, instead of food, that is attractive to female.

Mate preference ranking



Mate choice or social behavior?

- Repeating above experiment and just replace the male with female in two sides



- The female near which the female spent most of her time was identified as the preferred female and the other one the less-preferred female.

Mate choice or social behavior?

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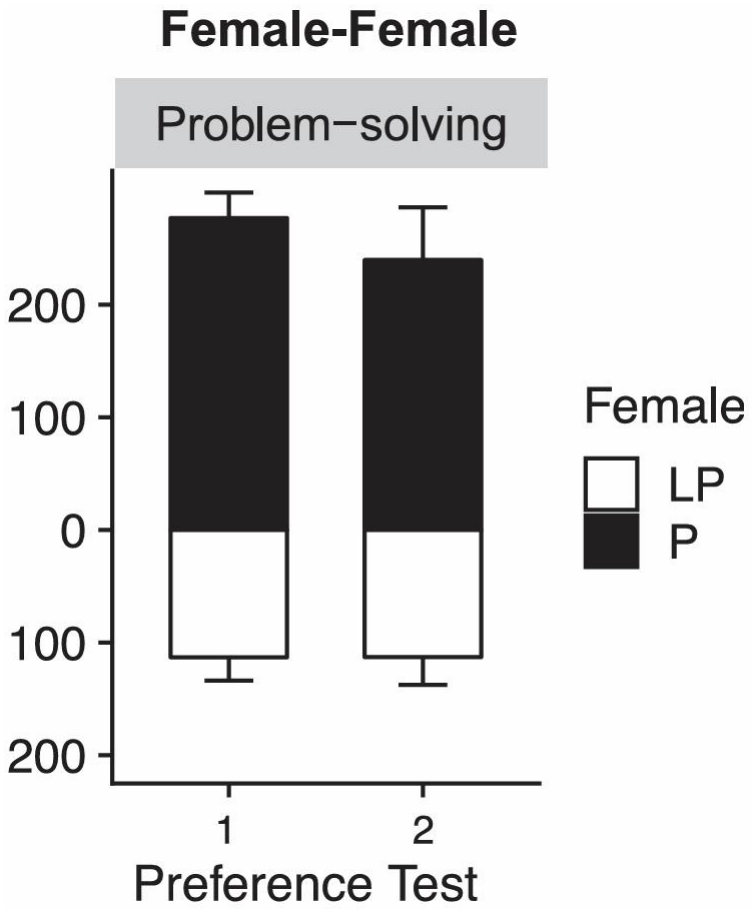

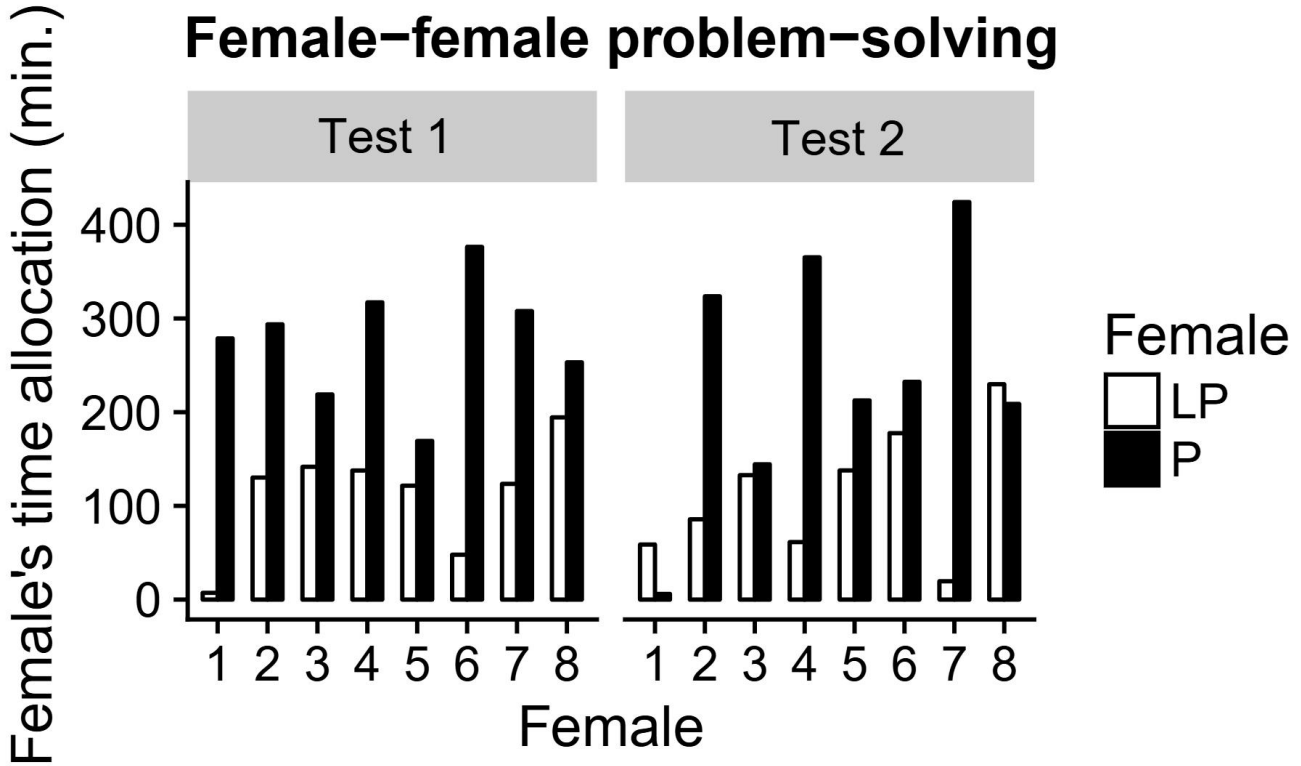

Discussion

- The female might have attributed male success in opening the containers to superior physical strength, instead of cognition or intelligence.

- No male mate choice.

Interesting & Economy Design, < 20,000 Yuan

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Thanks for attentions