Olfactory discrimination performance and long-term odor memory in Asian elephants
(Elephas maximus)

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Background

Behavioral evidence suggests that Asian elephants strongly rely on their sense of smell in a variety of contexts including foraging and social communication. In the present study, I explore the olfactory capabilities in Asian elephants by testing their ability to discriminate between structurally related odorants.

Aim

Collect data on olfactory discrimination performance for structurally related odorants in three female Asian elephants

Collect data on olfactory long-term memory

Compare data to those of other species tested previously on the same sets of odorants

Material and Methods

- Procedure: Used an food-rewarded two-alternative operant conditioning.

- Used four aliphatic ketones, alcohols, aldehydes and carboxylic acids.

- Used 12 enantiomeric odor pairs.

- Used two odor combination for a three week and one year memory test.

Photo: Matthias Laska

Results

The results of Saba(diamond), Saonoi(square) and Bua(triangle) for aliphatic odorants, enantiomers and memory test. The criterion level was set at 70%, two-tailed binomial test, $p<0.05$)
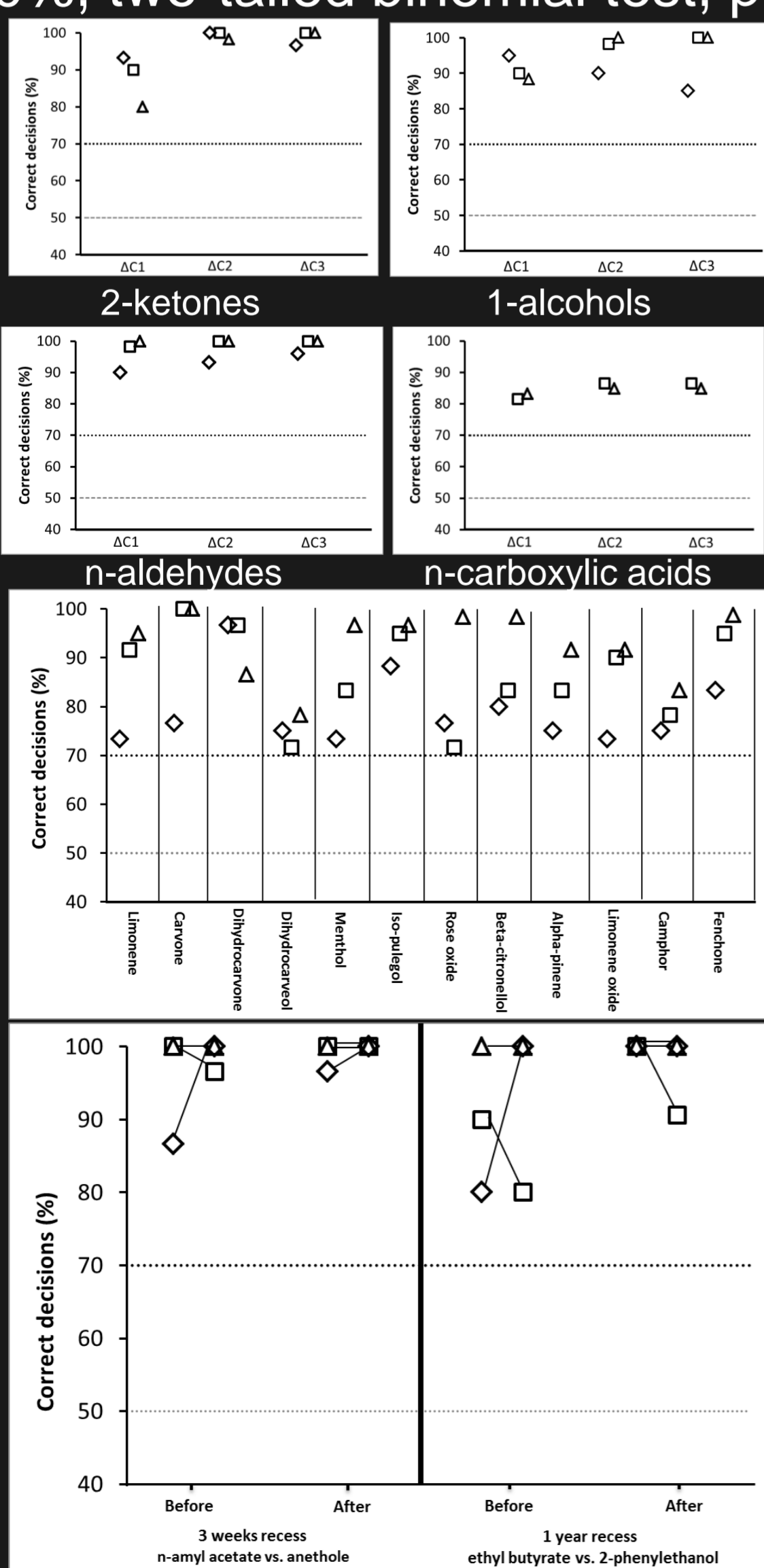

Conclusion

These three Asian elephants are able to discriminate between all structurally related aliphatic odorants and all enantiomeric odor pairs tested

The long-term odor memory was outstanding since they remembered the rewarded value of the odor combination after one year of recess

These three Asian elephants are at least as good, or better at discriminating among aliphatic odorants and among enantiomeric odor pairs as other species (e g, mice, humans, honeybees, South African fur seals)