From antelopes to zebras: can socio-ecological factors and personality explain inter- and intra-specific variation in ungulate cognition?

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Introduction

Inter-specific variation and the evolution of cognition
- complex cognition repeatedly and independently evolved in different taxa as the result of convergent evolution (3-5)
- phylogenetic relationships also explain the distribution of cognitive skills (6)
  - by comparing cognitive skills → we can map variation in problem-solving abilities + understand proximate processes leading to the emergence of complex cognition (1)
  - by understanding the evolutionary challenges linked to the emergence of specific skills → we can shed light into the evolutionary origins of human cognition (2)

Inter-specific variation - ecological hypotheses
- dietary breadth
- food item distribution
- predation risk and habitat
- migration
- domestication

Inter-specific variation - social hypotheses
- group size
- social complexity

Inter-specific variation - brain size
- larger brains are linked to enhanced cognition → brain size often used as proxy of cognitive abilities (7,8)

Intra-specific variation
- sex, age, rank, sociality
- personality traits

Ungulates: novel model to test evolutionary hypotheses
- impressive variety of socio-ecological characteristics (9)
- very few studies explored the link between cognition and socio-ecological characteristics (9-11)
- economically crucial → still little is known about their cognition
- strong impact on welfare decisions → fostering better living conditions for captive individuals (12-15)
- easily accessed in most zoos and captive facilities, housed in large groups → large sample sizes (13,16,18-21)

Gaze-Following (done)

Main Research Questions (to do)
- How do different ungulate species perform in a novel battery of 17 experimental cognitive tasks (requiring physical and social skills)?
- Which individual factors best predict intra-specific variation in cognitive skills?
- Which socio-ecological evolutionary hypotheses best explain the distribution of cognitive skills across species, when controlling for intraspecific variation?
- Which neuroanatomical measures best predict cognitive performance in ungulates?

Project is bound to be successful
Regardless of the results obtained:
- we will determine the distribution of cognitive skills across individuals and species
- we will contrast different evolutionary hypotheses

Referenzen