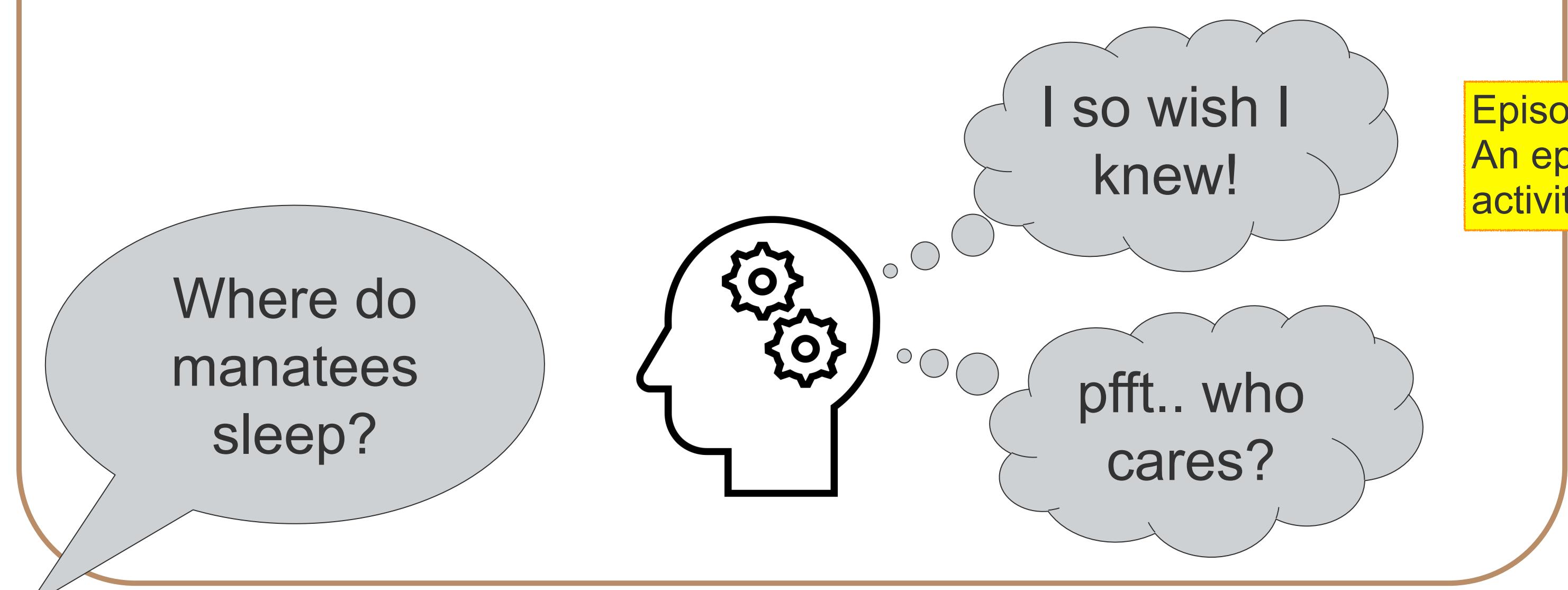




# In search of origins of curiosity

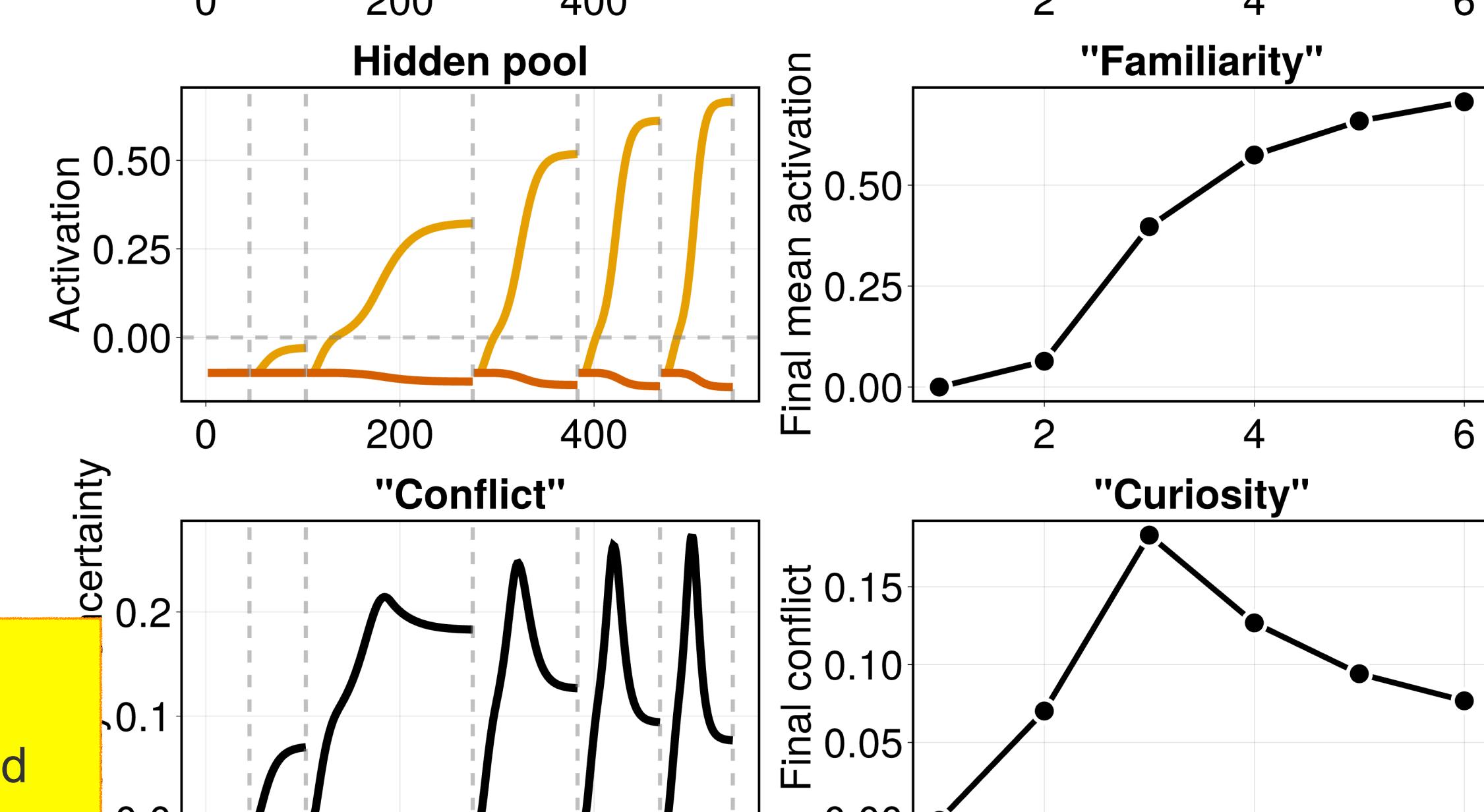
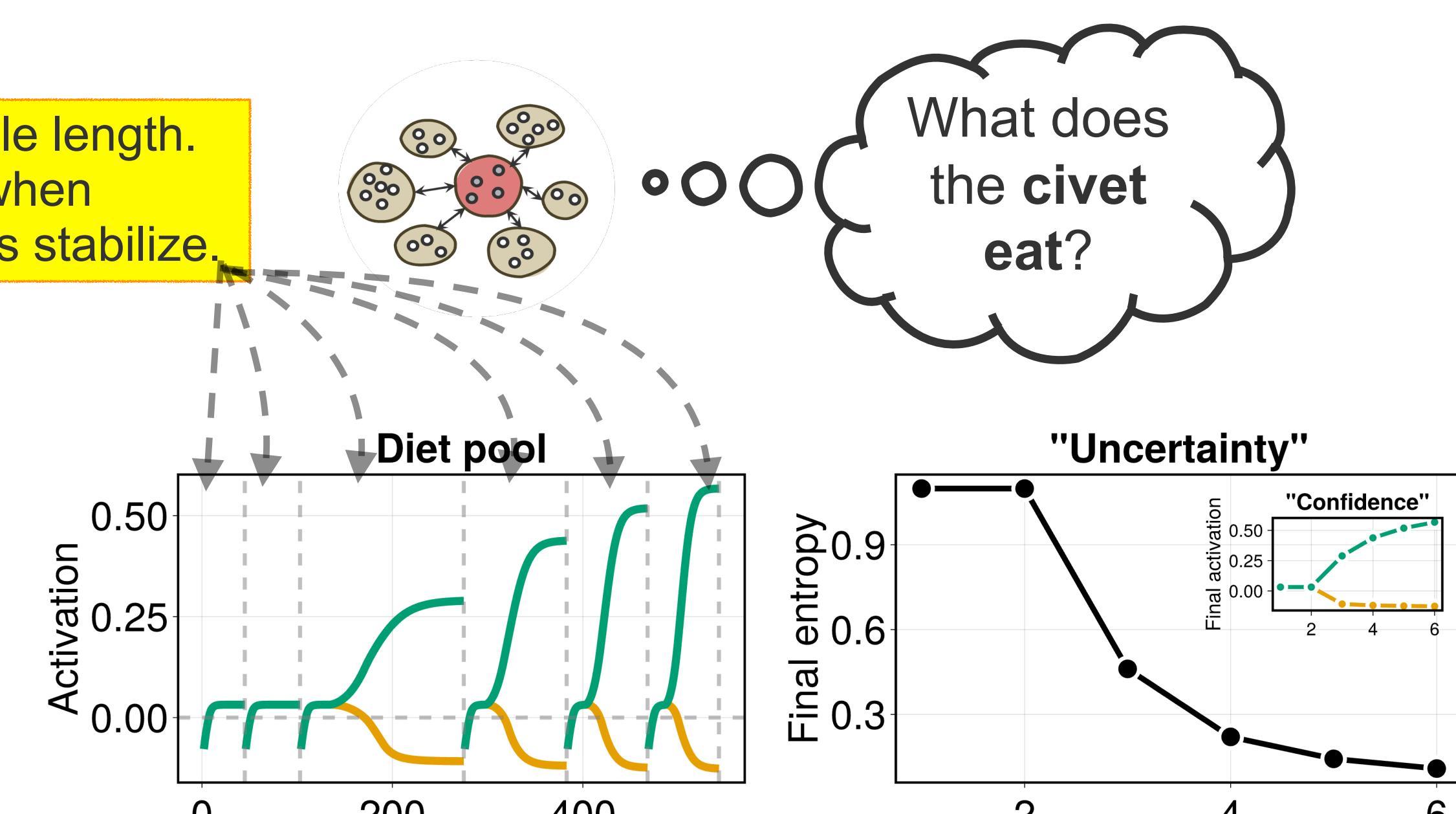
Alexandr Ten & Aditya Singh

## What are the cognitive origins of curiosity?



Episodes of variable length.  
An episode ends when activities of all units stabilize.

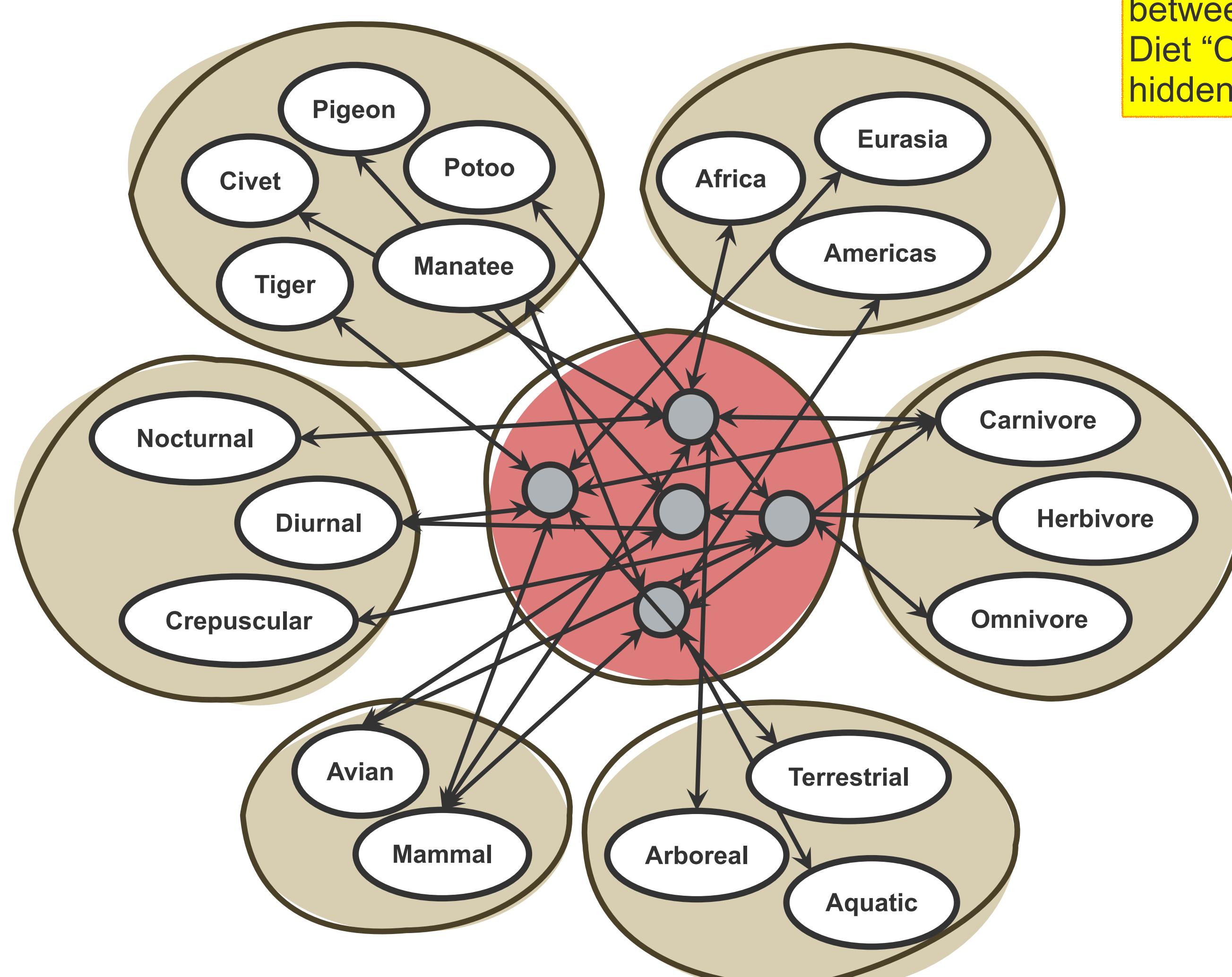
## Inverted U between knowledge and curiosity



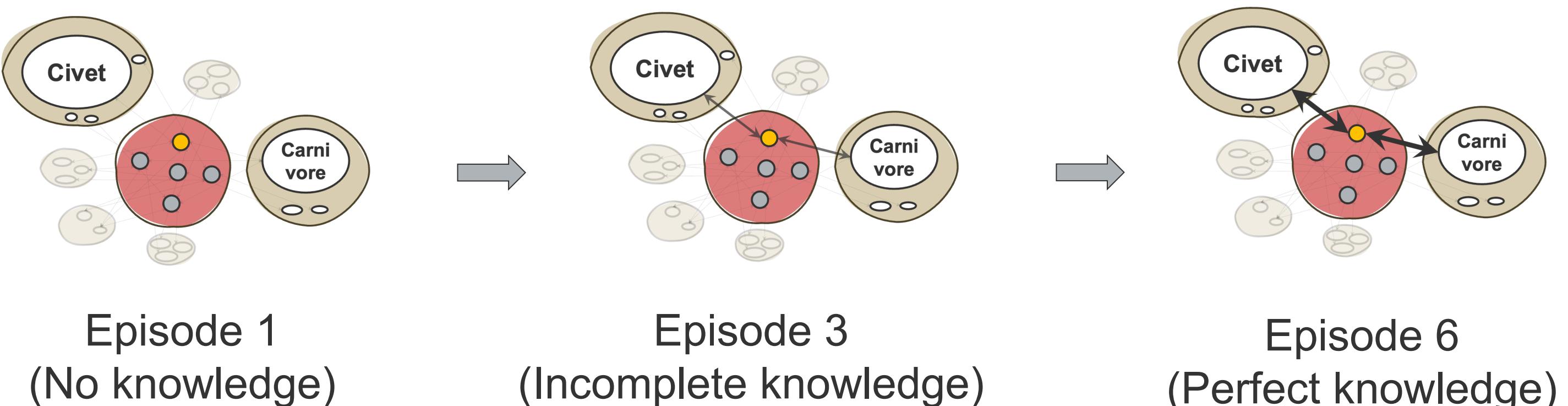
## Connectionist model of associative memory

Interactive Activation and Competition (IAC) Network

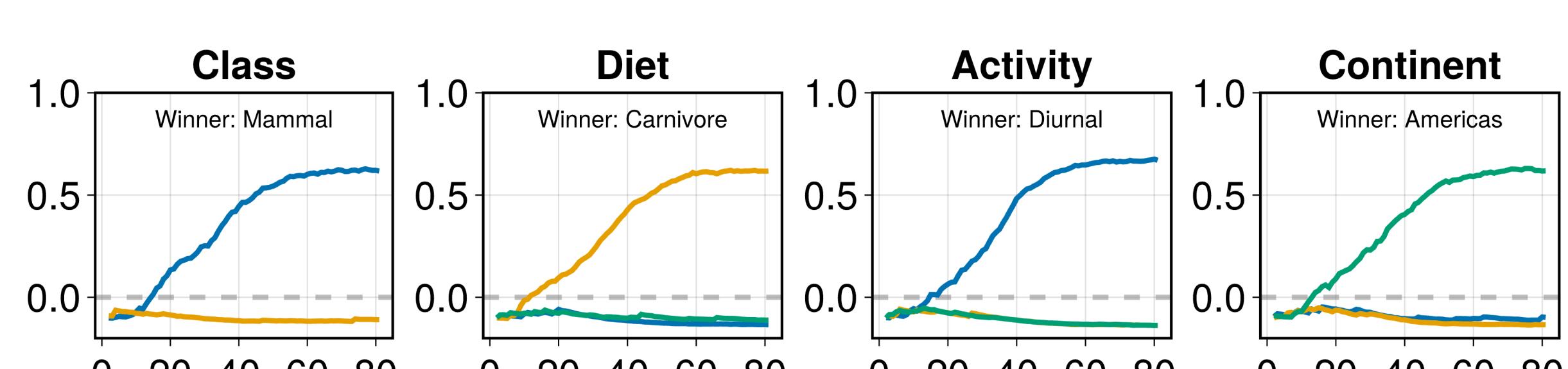
Species	Class	Diet	Habitat	Activity	Continent
Civet	Mammal	Carnivore	Terrestrial	Nocturnal	Africa
Manatee	Mammal	Herbivore	Aquatic	Diurnal	Americas
Tiger	Mammal	Carnivore	Terrestrial	Diurnal	Eurasia
Great potoo	Avian	Omnivore	Arboreal	Nocturnal	Americas
Green pigeon	Avian	Herbivore	Arboreal	Diurnal	Africa
...	...	...	...	...	...



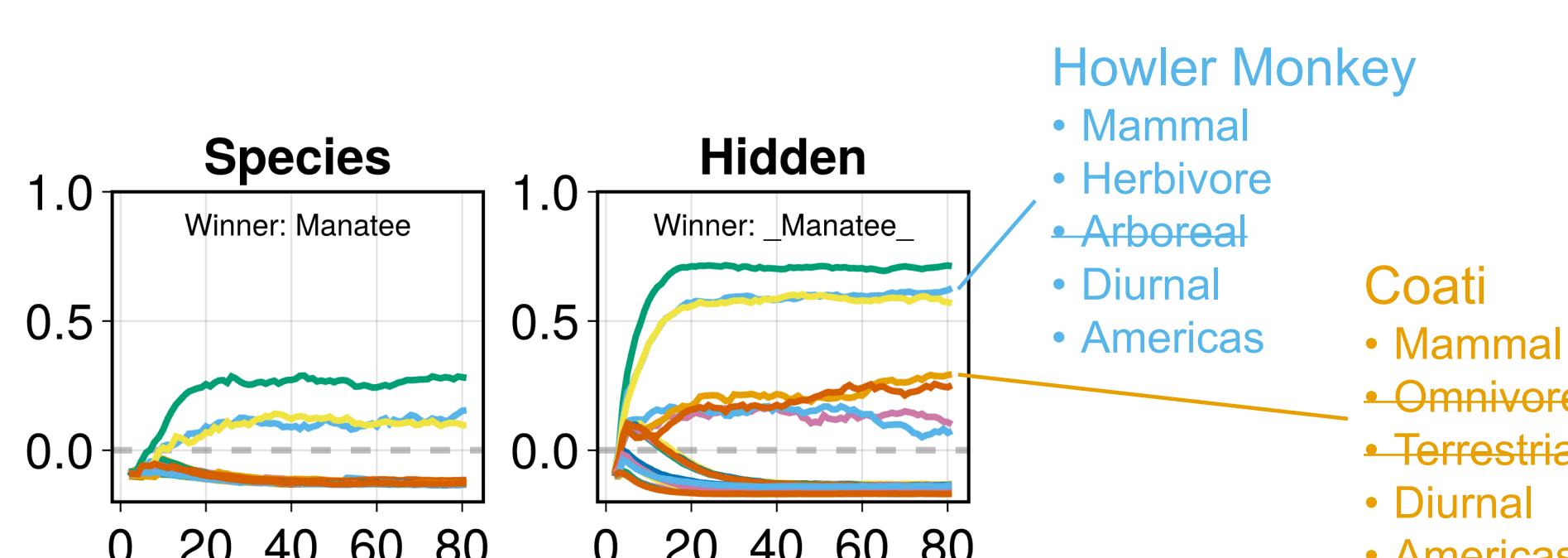
On each consecutive episode, the connections between Name "Civet" and Diet "Carnivore" through a hidden unit strengthens.



What do you know about the Coyote?



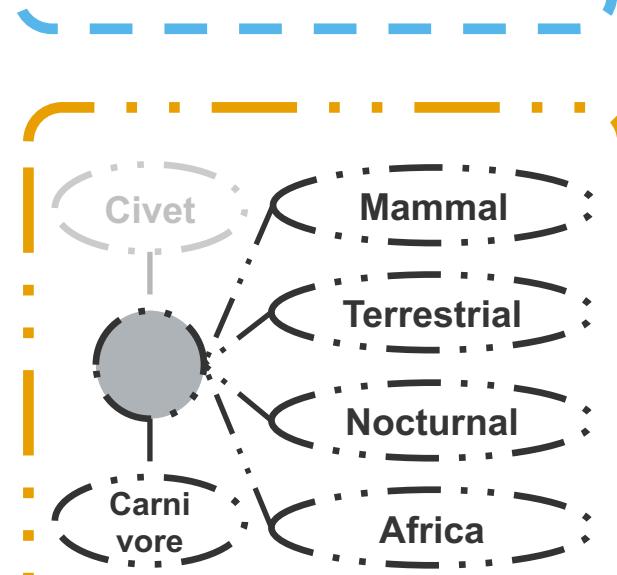
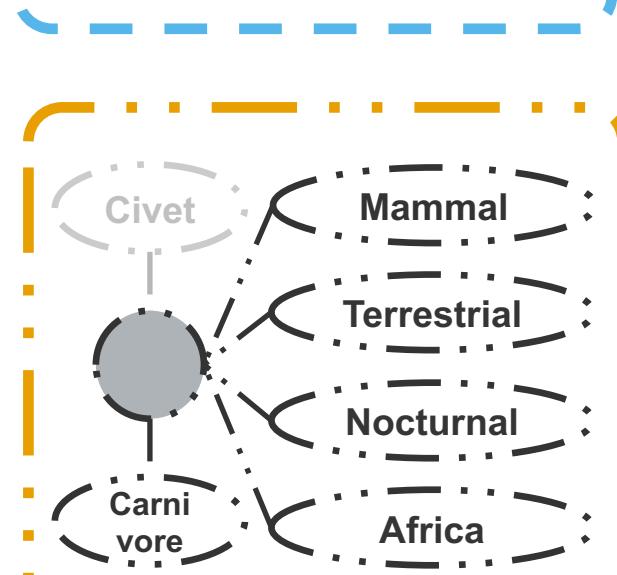
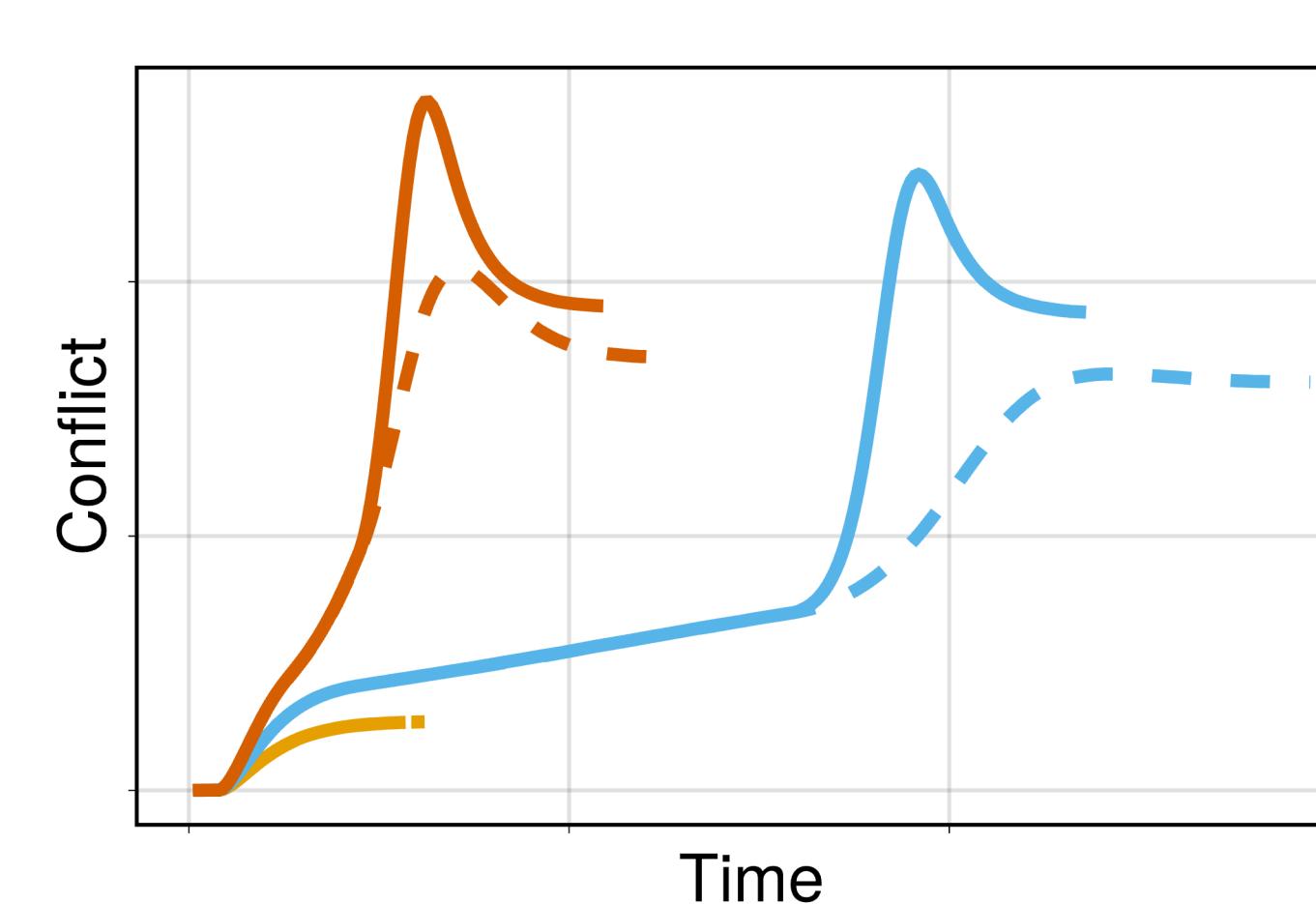
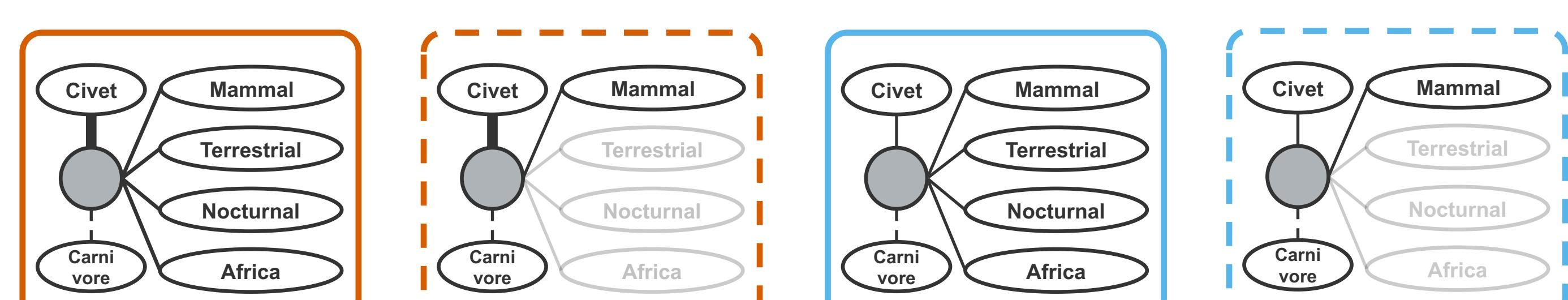
What herbivorous aquatic mammal species native to Americas do you know that is mostly active during the day?



## Generating novel predictions

Examples:

- Deliberation ~ Familiarity + Familiarity<sup>2</sup>
- Curiosity ~ Familiarity + Retrieval



## Key literature

- Berlyne, D. E. (1960). Conflict, arousal, and curiosity. McGraw-Hill Book Company.
- Brooks, G., Yang, H., & Köhler, S. (2021). Feeling-of-knowing experiences breed curiosity. *Memory*, 29(2).
- Koriat, A. (1993). How do we know that we know? The accessibility model of the feeling of knowing. *Psychological review*, 100(4).
- McClelland, J. L. (1981). Retrieving general and specific information from stored knowledge of specifics. In *Proceedings of the Third Annual Conference of the Cognitive Science Society*.
- Metcalfe, J., Schwartz, B. L., & Eich, T. S. (2020). Epistemic curiosity and the region of proximal learning. *Current opinion in behavioral sciences*, 35.
- Ten, A., Oudeyer, P-Y., Sakaki, M., & Murayama, K. (in review). The curious U: Integrating theories linking knowledge and information-seeking behavior.