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Are sheep really afraid of the wolf?

Ines Achin, Mélody Morisse, Céline Parias, Scott A. Love, Antoine Bourlier, Olivier Lasserre, Karine Larose, Denis Jeantet, Pascal Chevreau, Baptiste Mulot, et al.

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Facing a trade-off between the risk of predation and access to food, the ewes were motivated to eat and were not afraid by the presence of wolf odour.

Abstract Sheep are a high-olfactory sensitive species, this cue being crucial for social recognition (Hild et al. 2011) and predator avoidance (Gluesing et al. 1980). To protect themselves from predation, sheep are able to recognize cues of their predators. In a food-choice test, ewes chose to eat in the location without dog feces, this odour appeared to be repellent (Arnould et al. 1993). However, there is a trade-off between foraging and the risk of predation. We chose to test this trade-off.

Our experimental design questions the motivation to eat in a context with a possible risk of predation. **We hypothesize that olfactory stimuli with negative valence (wolf and cadaverine) will induce stress-like behaviors.** 30 adult Ile de France ewes participated after one week of habituation to the experimental setup in the presence of four unfamiliar conspecifics.

During a test, ewes entered an arena in which a plexiglas box contained the olfactory stimulus close to a bucket of pellets, for 5 minutes. The total number of vocalizations, the food intake and the food intake latency were recorded. In a first session, ewes were tested with water, 15µl orange essential oil (appetitive) and 3g of wolf feces (repulsive). In a second session, ewes were tested with water, 15g of wolf feces and 1ml of cadaverine. In this way, we tested the repulsive impact of predator feces and the putative repulsive effect of one its components.

According to our hypothesis, we found a repulsive effect of wolf feces in each session by a decreased food intake ($p < 0.01$, Friedman test). Surprisingly, we didn't observe a repulsive effect of cadaverine even though two ewes expressed emetic behaviors. Moreover, the latency of food intake was lower for orange and wolf compared to water ($p < 0.05$, Friedman test) and the number of vocalizations was low and did not differ between stimuli.

Taking into account all these results we are not able to conclude on the stressful impact of these olfactory stimuli of negative valence. Future work will use wireless EEG to investigate the underlying neural signatures of these stimuli.

No stressful experimental context

Training

3 days for each group of 3 to 4 familiar ewes.
2 days training for each ewe alone in presence of 4 unfamiliar adult ewes housed in adjoining park.

Testing in presence of 4 unfamiliar adult ewes housed in adjoining park.

