



# Can seals detect fish rich in oil with their sense of smell?



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## Background

- Few studies on olfaction in marine mammals.
- Brain of pinnipeds - somewhat reduced olfactory areas.
- Some authors states - seals have a poor sense of smell.

**Aim:** Develop a method to test olfactory capabilities in Cape fur seals. Test if they are able to discriminate between odors and in particular between the odors of fish that differ in their content of oil. Test their long-term memory for odors.

## Conclusions

- Cape fur seals are able to discriminate between odors.
- They are able to discriminate between fish that differ in their content of oil.
- They have a long-term memory for the reward value of odors.
- Cape fur seals can be trained to discriminate between odors.

## Method

- Four seals participated in this study.
- A rewarded operant conditioning paradigm was used.
- The seals had to choose between two odors that were simultaneously presented to them.
- Criterion: 75 % correct choices in two consecutive sessions.

Rewarded stimuli (S+)	Unrewarded stimuli (S-)
Ex. 1: Fish + salmon oil	Y S. Empty container
Ex. 2: Fish + salmon oil	Y S. Clove (essential oil)
Ex. 3: Fish + salmon oil	Y S. Black pepper (essential oil)
Ex. 4: Fish + salmon oil	Y S. Myrtle (essential oil)
Ex. 5: Fish + salmon oil	Y S. Fish without salmon oil
Ex. 6: Squid	Y S. Fish without salmon oil
Ex. 7: Empty container	Y S. Empty container

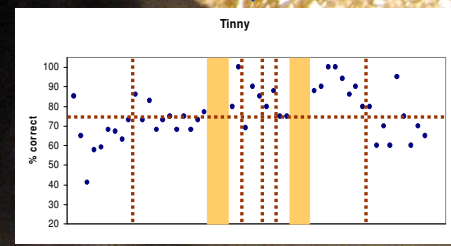
The odor-combinations used in this study. They were used in different experiments in this study.

## Results

- All animals were successful in discriminating between the different odors tested.
- They successfully discriminated between the odors of fish that differ in their content of salmon oil.
- In memory tests they were also successful, performing in a similar way before and after breaks of seven and 14 days.



The picture on the left show the experimental set-up with the two containers in which the different odors were kept and the picture on the right show a seal making a choice.



Experiment: 1 2 B1 2 3 4 5 B2 5 6

These are the results of one of the animals. The vertical lines show where the experiments ended and began and the areas marked with B1 and B2 show two breaks after which I could measure the fur seals memory for odors.