







Don't move! – Training dogs to conduct fMRI studies while they are awake

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Introduction

and dogs share a long period of close Humans interaction and co-habitation, shaping each other's socio-affective behavior. Hence, investigating possible similarities in the socio-affective processes and brain activities by using fMRI (functional magnetic resonance imaging) in humans and dogs is an important research goal [1]. Dogs have evolved specialized social skills similar to humans through convergent evolution [2], thus representing a particularly good model. To date, most studies have focused on dog behavior, but little is known about how their brains function or how similar their brain mechanisms are to humans'.



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Fig. 1: Stepwise dog pre-training schedule with increasing training criteria



6. Remain motionless

Methods

* Pre-training with a mock scanner equipped with loudspeakers and a monitor in front For the entire training procedure we used **positive**

reinforcement and food reward for the correct

1. Stay in prone position with head in the mock coil up to <u>5 min</u> on the floor

the ramp

and stay

moving

table

Training criteria to the 3. Stay in prone 2. Walk up position scanner with the head in the still on the mock coil up to <u>5 min</u> in front of the mock wear scanner bore plugs/

5. Stay still with the 4. Get used head in the coil while increased moving volume of into and stay in the playback mock sounds up scanner to 100 db bore up to **10 min** Learn to human ear head wrap

in the mock scanner while watching videos

behavior

Subjects: $N_1 = 4$ previous pilot dogs, $N_2 = 16$ newly trained dogs; various breeds; age range: 1-11 years **Scanner environment:** after successful pre-training the dogs passed a medical check and proceeded to further training with the real human knee coil and fMRI scanner (3T, Siemens Skyra) **Dog training frequency:** pre-training = 1x/ week scanner training = 2-3x/ month

Average time span of: pre-training = 21 sessions (S) scanner training (until first scan) = 2-3 S

scanner training (until first test) = 4-6 S







References

[1] Huber L & Lamm C (2017) Understanding dog cognition by functional magnetic resonance imaging. Learn & Behav 1-2. [2] Hare B & Tomasello M (2005) Human-like social skills in dogs? Trends in Cognitive Sciences 9(9), 439–444.



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