the open one. Each set of who-where-when was individualized and random. The older male responded properly in all four test phases, the younger male in 3 of 4 phases, and the female failed due to her preference for one gate.

Key words: episodic-like; integrated memory; open field; cats; who-where-when

13

The development of an emotional ethogram for *Felis silvestris* focused on FEAR and RAGE

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Affective neuroscience describes FEAR and RAGE (frustration) as basic emotional systems related to negative affect (Panksepp 1998), and this emotional component to behavior should not be confused with its motivation. FEAR is aroused by the anticipation or presence of an aversive stimulus, whilst RAGE is triggered by the denial of a valued incentive and/or where expectations are not met. Spontaneous, involuntary facial expressions occur due to the contraction of specific muscle groups as part of emotional arousal, and as such have been used to make inferences about affect in a range of different mammalian species. We sought to reliably define the spontaneous facial responses associated with FEAR and RAGE in *F. silvetris*. Using two captive populations of Scottish Wildcats (*Felis silvestris grampia*), a series of controlled protocols incorporating appropriate situational contingencies were video-recorded. For FEAR this included a person directly approaching a cat that was free to withdraw, and for RAGE, a cat was briefly denied access to food at feeding time. Footage collected was coded using CatFACS (a feline facial action coding system (Caeiro et al., 2013). Preliminary results suggest the ear position EAD 105 (ears downwards) was primarily associated with the FEAR conditions, whilst EAD 104 (ears rotator) was associated with the RAGE conditions. Within the RAGE condition, laterality in ear position was also observed, suggesting a right EAD 104 (ear rotator) bias. The type of information generated from this research can be used to help differentiate between these two core emotions.

Key words: cat; aggression; ethogram; emotion; affective neuroscience

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14

Automatic behavioral analysis for kenneled dogs: A 3D perspective

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Artificial housing systems can be deleterious for farm, laboratory and zoo animals. Recently, considerable attention focused on the effects of kenneling on dog welfare. Behavior is one of the preferred indicators of animal welfare because it is the most direct reflection of the animal's coping success and emotional state. Behavioral assays are also non-invasive. We created a prototype of a new video analysis solution designed to automatically infer the behavior of dogs housed in kennel environments from 3D visual data. The technique is based on a structured machine learning framework that identifies and classifies the dog's body parts to later recognize postures and patterns of movement. By giving in-depth information, 3D features partially solve the problem of occlusion among body parts. The prototype was tested under different experimental conditions to assess its level of accuracy in correctly detecting the dogs' body parts. The dog's trajectory inside the kennel is automatically computed and stored. The software detects similarities among temporal pattern of movements to automatically collect the most frequent observed behavior which can be manually labeled. Automatic image recording allows large amounts of data to be archived over long periods of time, with high accuracy, saving human labor. By training the learning framework on the normal behavior of confined dogs, it will then be able to detect potential abnormalities (e.g. stereotypies) expressed by individuals. This 3D framework is invariant to dogs' breed and size and could be easily extended to other quadrupeds models.

Key words: artificial housing; automatic recording; behavior; computer vision; dog

15

Incentivizing cat electronic identification

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Pet identification and registration play a key role in guaranteeing animal health and welfare, and they stimulate responsible ownership, helping to control the phenomenon of straying. Transponder implantation provides a permanent identification system currently frequently used for dogs, but it still not common for cats. Cat electronic identification (CEI) seems to raise general public skepticism, especially concerning its safety. No scientific studies have tested its efficacy or evaluated the frequency of adverse effects of such systems over time in domestic felines. This study evaluated long-term effects of electronic identification on 126 cats. Cats were divided into two groups to test transponders of two sizes (12mm/9mm). Transponders were implanted in the neck. Periodic clinical examinations were carried out up to six months after implantation. A smartphone application, connected to the transponder reader via Bluetooth, was developed to automatically open the cat record form to insert clinical information during the check-up, avoiding manual data transcription. No adverse local reactions were observed. Fisher's test showed that migration events were rare and not significantly associated to the transponder size or the sex of the animal. Micro-chipping did not impair cat health and welfare. The 9 mm transponder could be proposed as the standard CEI. It requires a 25% thinner needle and so may be more readily accepted by apprehensive owners. CEI is a reliable identification system for domestic felines. CEI could improve the management of cat colonies and promote more responsible ownership.

Key words: domestic cat; electronic identification; traceability; transponder; welfare