Positive emotions and quality of life in dogs

Commentary on **Kujala** on *Canine Emotions*

Patrizia Piotti
Department of Ethology
Eötvös Loránd University, Budapest, Hungary

Abstract: Positive affect is fundamental to ensuring good animal welfare. Discrete and dimensional theories of emotion have recently been used to explore the relation between cognition and affect and to develop cognitive measures of positive affect. Human quality-of-life assessment focuses on positive affect, which is difficult to measure objectively in dogs. Expanding on Kujala's (2017) discussion of positive emotions and cognitive measures of affect, I suggest how these are relevant to assessing canine quality of life.

Keywords: dogs, emotions, cognitive measures, quality of life, dimensional theories

Patrizia Piotti, post-doctoral researcher in veterinary behavioural medicine and comparative cognitive neuroscience, currently studies cognitive ageing in dogs with the Senior Family Dog Project, Eötvös Loránd University. Patrizia's other research interests are canine collaborative behaviour, individual differences in nonhuman animals and humans, and psychoneuroendocrinology.
patriziapiottivet.wordpress.com

1. Positive emotions and quality of life

Kujala's (2017) target article touches several aspects of the study of emotion in dogs, focusing on 'discrete' (specific) emotional states, but little attention is given to the 'dimensional' approach in emotion research (Carver, 2001; Gray, 1994; Mendl, Burman, & Paul, 2010b; Russell, 2003). Kujala does mention a bias in research outputs toward negative (unpleasant) rather than positive (pleasant) emotions. This exists despite the fact that having positive affective states is fundamental in ensuring good animal welfare (Balcombe, 2009; Boissy et al., 2007; Mendl, Burman, Parker, & Paul, 2009; Yeates & Main, 2008). Missing from the target article are dimensional approaches and the relevance of cognitive measures of positive affective states in assessing quality of life (QoL) for dogs.

Animals are motivated to avoid pain and suffering as well as to seek rewarding stimuli. It has been suggested that pleasure has adaptive value, encouraging them to behave in ways that favour the continuation of the species, just as avoidance of suffering does (Boissy et al., 2007). Thus, sparing captive animals from negative experiences does not ensure good welfare; providing positive experiences is also necessary (Fraser, Weary, Pajor, & Milligan, 1997; Yeates & Main, 2008). In fact, the absence of signs of positive affect may itself be an indication of emotional discomfort. This is particularly important in those contexts where the quality of the life of an animal is at risk (McMillan, 2003; Morton, 2007; Yeates & Main, 2009).

In human medicine, QoL assessment is a fundamental component of decision-making (Sanders, Egger, Donovan, Tallon, & Frankel, 1998), whereas in veterinary medicine it is a relatively recent field (Yeates & Main, 2009). QoL assessment should inform decision-making concerning chronic and/or painful conditions, euthanasia (McMillan, 2003), and behavioural problems (Karagiannis, Burman, & Mills, 2015; Mills, 2017). It also allows issues to be identified that are not typically perceived by pet owners (e.g., obesity, exercise, geriatric concerns).

QoL assessment in humans emphasizes affective states, such as happiness (Schwartz & Rapkin, 2004). Given animals' drive to seek pleasure (Boissy et al., 2006), positive affective states are directly relevant from the individual's point of view (Yeates & Main, 2008). This is just as important for dogs (Fraser et al., 1997; Wallis et al., 2017; Yeates & Main, 2009), although, as Kujala, Somppi, Jokela, Vainio, and Parkkonen (2017) note, assessment is problematic because the human interpretation of canine emotions is filtered by personality traits, interpersonal reactivity, and individual experiences. For this reason, objectivity and avoiding the risk of over-interpretation are especially important.

2. An integrative approach to the study of emotion

Mendl et al. (2010b) have proposed a psychobiological framework which integrates *dimensional* and *discrete* theories. Emotions are conceptualized on the basis of universal core characteristics: valence (positive or negative) and arousal (low or high). Valence and intensity are orthogonal, so they are mapped in a two-dimensional system: the 'core affect space', which has a bi-directional relationship with discrete emotions (Mendl et al., 2010b). Thus, the discrete approach (which is largely followed by Kujala et al., 2017) and the dimensional approach are easily integrated. Cumulative experiences of location in a core affect space have a long-term effect on the animal, such as changes in mood (Ekman, 1994). Moods are long-term, relatively stable, affective states (Davidson, 1994) related to previous experiences with the presence or probability of rewards or threats to the animal's ability to cope. An advantage of dimensional approaches is their functional relevance: they allow one to make *a priori* predictions of phenotypic manifestations of emotions and to define hypothesis-based measures that are universal across species, thereby facilitating translational approaches. The integrative framework proposed by Mendl et al. also takes into account both the valence of stimuli and the individual's susceptibility to them.

3. Cognitive measures of emotions to monitor quality of life

Another advantage of the dimensional approach is the link between cognition and emotion: cognitive measures can be used to get objective measures of emotional valence, including measures of positive emotions (Paul, Harding, & Mendl, 2005). Kujala cites the cognitive bias tests, which measure behavioural responses to stimuli that are positive (pleasant), negative (unpleasant), or ambiguous (i.e., can be interpreted as either positive or negative). The rationale is that individuals feeling negative affect interpret ambiguous stimuli more negatively than those feeling positive affect, a phenomenon called cognitive (judgment) bias (Harding, Paul, & Mendl, 2004). There is evidence that dogs affected by certain behavioural problems (Mendl et al., 2010a) or neuroanatomical malformations (Cockburn et al., 2017) have a relatively negative bias when judging ambiguous stimuli, compared to unaffected individuals. Behavioural and

pharmacological treatment of separation-related problems leads to a shift towards a less negative bias in dogs (Karagiannis et al., 2015). Increased positive bias was also observed in dogs following the administration of oxytocin, especially when a communicative component was added to the test (Kis, Hernádi, Kanizsár, Gácsi, & Topál, 2015).

These examples show how cognitive methods can be used in veterinary practice to monitor changes in long-term affective states when treating behavioural problems or managing chronic and potentially painful conditions. According to the psychobiological approach of veterinary behavioural medicine (Mills, Dube, & Zulch, 2012; Mills & Ewbank, 2016), an intervention for behavioural problems should be evaluated in terms of improvement of both the clinical signs and psychological state (Karagiannis et al., 2015; Mills, 2017). This should be extended to all situations where dogs' QoL is at risk (Fraser et al., 1997; McMillan, 2003; Morton, 2007). Clinical decisions regarding medical interventions, chronic conditions, geriatric patients, or euthanasia, should be based on clinical signs *and* affective states (Wallis et al., 2017). Similarly, clinical assessment should include measures of both negative and positive affect (Yeates & Main, 2008).

4. Limitations and future research

There are limitations to the use of cognitive measures to assess emotions, such as carry-over effects (Mendl et al., 2009) and affective contrast (Burman et al., 2011). Some animals (e.g., non-ambulatory ones) may be unable to participate in certain tests. Dimensional approaches allow cognitive measures to be combined with other tools, such as infrared thermography (Travain et al., 2015, 2016) or touch-screen technologies (Wallis et al., 2017). Particularly relevant to chronically/terminally ill and geriatric animals is the question of the degree of positive affect that should be guaranteed. Future research on affective states in QoL assessment should aim to answer questions like this. Through integrated and dimensional approaches, cognitive measures can help identify behavioural phenotypes for positive and negative affect (Mendl et al., 2010b). They can also be combined with other methods — for example, hair cortisol (Esarcova, Ottferova, Kurkova, Eskova, & Mecova, 2017), salivary IgA (Kikkawa, Uchida, Suwa, & Taguchi, 2005), and fMRI (Andics, Gácsi, Faragó, Kis, & Miklósi, 2014; Andics, Gál, Vicsi, Rudas, & Vidnyánszky, 2013; Maddock, Garrett, & Buonocore, 2003) — to develop and validate markers of both negative and positive emotional states (Paul et al., 2005).

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