



Cannabidiol (CBD) Elicits Contagious Yawning in the Domestic Cat, a Non-Social Species Lacking Spontaneous Contagious Yawning

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ABSTRACT

The current study investigates contagious yawning (whereby one individual's yawn triggers another individual to yawn) in domestic cats, a non-social species and in domestic dogs, a social species. In several domesticated animals as well as in wild animals, these phenomena are known to occur. However, the reported cases are restricted to social species. In the current study, for the first time, the author tested whether contagious yawning occurred in response to their caregivers' yawn in 40 cats (randomly divided into two groups) and 20 dogs. It was found that the cats did not yawn contagiously in response to human yawning, but this behaviour did occur in most of the dogs. Next, each of the two groups of the cats received the administration of cannabidiol (CBD), the primary non-addictive component of cannabis, at 4.0 mg/kg/day over a 2-week-period, or the administration of the same amount of sunflower oil as placebo (the CBD group and the Placebo group). When their responses to their caregivers' yawning were tested again after the end of the administration, the number of yawning cats significantly increased in the CBD group, but not in the Placebo group. The results indicate that CBD could exert effects to elicit contagious yawning in domestic cats, non-social species. When CBD is administered, they become more susceptible to contagious yawning and consequently more likely to be triggered to yawn after viewing the yawn of their caregivers.

Key words: Cannabidiol, Cat, CBD, Contagious yawning, Dog.

Spontaneous yawning is a behaviour pattern commonly observed among a number of groups in vertebrates. It is believed to be closely linked to physiological and behavioural aspects of life. Contagious yawning, which is yawning by sensing another yawning, on the other hand, is an evolutionary recent behavioural trait (Smith, 1999). The general consensus among researchers is that it is linked to behavioural synchronization in highly social species. In fact, it has been reported in nonhuman primates, wolves, budgerigars, sheep and domestic dogs (see Pedruzzi *et al.*, 2022 for review), all social species. When the red-footed tortoise was tested, negative evidence was found (Wilkinson *et al.*, 2011).

Evidence for interspecific contagious yawning has been meager and limited to chimpanzees (great apes), mangabeys (Old World primates) and dogs (Ito *et al.*, 2016) with which experimental evidence has been presented most abundantly since the pioneering study published in 2008 (Joly-Mascheroni *et al.*, 2008) that provided an initial standard for controls and methodology for subsequent research about contagious yawning in general. Given the similarity of the human relationships with domestic dogs (Dewangen *et al.*, 2025; Sophia *et al.*, 2025) and domestic cats (Kuk and Erol 2025), it seems reasonable to suggest that contagious yawning should be studied in domestic cats, another well-domesticate species, as it has been with dogs. Sociality among the *Felidae* family is rare and wildcats, the most closely related species to domestic cats, do not generally live in groups (Driscoll *et al.*, 2009). Thus,

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the cat-human relationship is unique in the way that domestication has adapted a non-social animal to social living with humans (Bradshaw, 2016). Attempts to compare the performance of contagious yawning between domestic dogs and cats and determine if the cats demonstrate synchronized yawning with human caregivers could better inform our understanding of the cat-human bond and changes in sociality due to the domestication between wild and domesticated cats.

In addition, in the current study, the author attempted to evaluate the administration of cannabidiol (CBD), the primary non-addictive component of cannabis, to the participant cats on their performance in the testing of contagious yawning. As described below, spontaneous contagious yawning was not observed in the cats tested in response to human yawning, but this behaviour did occur

in most of the domestic dogs. As a next step of the research, therefore, the author hypothesized that such yawning could be elicited in the cats when CBD, a phytocannabinoid component derived from the cannabis plant was administered because, in humans, it has been drawing attention as a potential anxiolytic, anti-panic and analgesic without the psychoactive effects associated with tetrahydrocannabinol (THC) (Costa *et al.*, 2007; Masataka *et al.*, 2025; Parker *et al.*, 2006; Devinsky *et al.*, 2016; McGuire *et al.*, 2018; Scuderi *et al.*, 2009; Whiting *et al.*, 2015; Masataka, 2019). Besides humans, both cats and dogs are provided with such endocannabinoid system with which CBD interacts almost in the same manner researchers think it does in humans (Vaughn *et al.*, 2021; Kulpa *et al.*, 2021). In cats, indeed, a recent study revealed anxiolytic effects of CBD administration in reducing sound-induced fear in healthy domestic cats in a laboratory model of thunderstorm simulation (Masataka, 2024b). CBD is a useful option to relax or calm down individuals whether they are humans or cats.

In this regard, the fact is noticeable that spontaneous yawning is known to occur most frequently when individuals are relaxed or calmed down, typically before and after sleep, whether they are humans or nonhuman animals (Provine, 1989). If cats, though a non-social species, become calmed down or relaxed by the CBD administration, the animals would be more susceptible to contagious yawning and consequently be more likely to be triggered to yawn after viewing the yawn of their caregivers - the author conceived the current study based on such reasoning.

The study was conducted in 2025 at Center for Research of Developmental Disorders, the organization with which the author affiliates.

Forty domestic cats, 20 domestic dogs and their caregivers participated in the current study. The cats were all, neutered males, varying in their ages between 3 and 6 years. They were mixed breeds. The dogs, included toy poodle ($n = 4$), shiba ($n = 10$) and miniature dachshund ($n = 6$), ranging in age from 4 to 7 years. Physical examination was performed by a veterinarian when the study started and weekly thereafter. All of them were healthy and were with no medication.

The caregivers were 16 men and 44 women, varying in age from 21 to 58 years. Detailed protocol of the experiment was essentially same as that by the previous study (Joly-Mascheroni *et al.*, 2008) to enable comparisons across studies. For each cat or dog, experiment was conducted in a room in the caregiver's home. Since the room was familiar to the animal, the author expected that the experiment there would be effective to reduce stress and novel environmental variables. When the experiment was undergoing, no one other than the caregiver and an experimenter was in the home.

Each animal participated in two conditions: A control condition where the caregiver performed an open mouth gape in the presence of the animal and the test condition

where the caregiver performed a yawn or fake yawn to the best of his/her ability in the presence of the animal. The open mouth gape was adapted from the previous definition (Smith, 1999; Provine, 1989; 2005) involving "the opening of the lower jaw, with no eye wrinkling, no noise and no upper body movement or stretching" (Provine, 2005). It is claimed that such individual feature does not elicit contagious yawning (Smith, 1999; Provine, 1989; 2005). On the other hand, "a normal or faked yawn includes the stretching of the mouth, wrinkling of the eyes, an inhalation followed by an exhalation and/or tilting the head back and stretching the upper body" (Provine, 2005). Conditions were counter-balanced, with half of the caregivers starting with yawn condition and the other half starting the control gape condition.

Instruction was given to caregivers to draw the attention of their animal in a way that was usual for them, which included but was not restricted to calling the animal's name, making a noise and using a toy before each yawn or gaping motion. Attention was determined by the looking at the caregivers by the animals.

When the study started, 20 of the 40 cats were randomly chosen to receive the CBD administration (the CBD group) while the placebo was to be administered to the remaining 20 cats (the Placebo group). The daily administration started since the next day when this assignment was conducted, *i.e.*, for the CBD administration, CBD at 4.0 mg/kg was administered every day thereafter with sunflower oil as carrier in the morning over a 2-week period. For the animals in the Placebo group, sunflower oil alone was provided as a matching placebo over the other 2-week period. Detailed protocol of the administration has already been reported elsewhere (Masataka, 2024b).

Before the administration of CBD or placebo, yawning was observed in 9 of the 20 cats in the CBD group and in 11 of the 20 cats in the Placebo group while 19 of the 20 dogs performed the yawning. Number of the dogs exceeded that of the cats statistically significantly whether the cats were included in the CBD group or in the Placebo group ($ps < 0.001$, Fisher's exact probability tests). Mean numbers of yawning observed are presented in Table 1. They were not statistically significantly different between the yawning and the gaping conditions for the 9 cats of the CBD group, or for the 11 of the Placebo group ($ps > 0.10$, binomial tests), but were significantly different between the two conditions for the 19 dogs ($p < 0.01$). The dogs yawned more often under the yawning condition than under the gaping condition.

When the cats were tested again after the administration of CBD or placebo, 19 cats in the CBD group performed the yawning. Number of yawning cats in the CBD group increased significantly, as compared with before ($p < 0.001$). Moreover, the number of yawning under the yawning condition significantly exceeded that under the gaping condition ($p < 0.01$). In the Placebo group, the yawning was observed in the 13 cats and increase from that recorded before the administration was not statistically significant ($p = 0.53$). In them, mean number of yawning did not differ, either, between the two conditions ($p > 0.10$).

Table 1: The number of animals (*N* in parentheses) who showed yawning in the dogs, and the cats who received the administration with CBD (the CBD group) and received the administration with placebo (the Placebo group) before the administration (Before) and after the administration (After), and mean numbers of the occurrences of yawning under two conditions.

	Dog	CBD group (Cat)		Placebo group (Cat)	
	- (<i>N</i> =19)	Before (<i>N</i> =9)	After (<i>N</i> =19)	Before (<i>N</i> =11)	After (<i>N</i> =13)
Yawning condition	4.1	1.1	3.6	1.2	1.3
Gaping condition	1.3	1.2	1.4	1.2	1.1

Concerning the cats, contagious yawning was not observed before the CBD administration. This was in contrast with the performance of the dogs tested. After the administration, however, the phenomenon was observed often whereas such change did not occur in the cats of the Placebo group. The results indicate the possibility that CBD administration could exert enhancing effects on susceptibility to contagious yawning. They are in line with recent findings of CBD administration in cats as well as in dogs (Masataka 2024a; 2024b; 2025; 2026). The study with dogs concerned with their excessive barking and that with cats concerned with their undesirable urination. Results of these studies found that the CBD administration was effective to reduce occurrences of such behavioural problems.

CONCLUSION

A recent study with Old World primates (mangabeys) report that conspecific and human familiar yawning stimuli evoked a stronger yawning response in the participants compared to unfamiliar counterparts. It is concluded that familiarity modulates intra- and interspecific yawn contagion in the species. Given these findings, results of the current study indicate the possibility that, as compared with animals of social species such as dogs, contagious yawning hardly occurs in animals of non-social species such as cats, who could be more likely to be triggered to yawn after viewing the yawn of their caregivers once CBD is administered, however.

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Disclaimers

The views and conclusions expressed in this article are solely those of the author and do not necessarily represent the views of his affiliated institution. The author is responsible for the accuracy and completeness of the information provided, but not accept any liability for any direct or indirect losses resulting from the use of this content.

Informed consent

All animal procedures for experiment were approved by the Committee of Experimental Animal. Care and handling technique were approved by the Center of Animal Care Committee.

Conflict of interest

The author declares that there are no conflicts of interest regarding the publication of this article. No funding or sponsorship influenced the design of the study, data collection, analysis, decision to publish, or preparation of the manuscript.

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