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as honest signals of the level of arousal and several indirect evidence suggest a link between the arousal of the individual and the harshness of their sounds. However, to our knowledge no studies attempted to test this link directly so far. Dog whines can provide an excellent model for this, as NLP is often present in them, and we can collect and compare whines from dogs experiencing different level of stress during separation from their owner. Thus in this study with using questionnaires about separation and vocal behaviour, we recruited family dogs that whine during separation, and according their owners have or lack separation-related stress. We recorded their whines and measured the occurrence of NLP. We compared the number of nonlinear events and biphonations between dogs reported to have separation problem and not. Our preliminary results from the data of 50 subjects showed that there were difference only between the occurrences of nonlinearities in the first fundamental frequency. Significantly more nonlinear phenomena were found in the whines of the stressful subjects. Additionally we are currently running quantitative acoustical analysis and behaviour coding to find additional associations between the inner state of the subjects and the acoustical parameters of their whines. Our preliminary results are promising, suggesting that nonlinear phenomena in whines are possibly act as indicators of stress level in dogs.

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Acoustic cues to individuality and species in *Spheniscus* penguins: a source-filter theory approach

ABSTRACT The diversity of colonial lifestyles displayed by penguins presents different challenges for vocal production and recognition. Banded penguins (*Spheniscus* spp.) are unusual as they are highly territorial, and build nests in underground burrows. Banded penguins also have complex vocalisations (display songs), which are relevant for

mate and parent-offspring recognition. Moreover, they produce contact calls to maintain social relationships and group cohesion. We collected acoustic recordings from two large ex-situ colonies of African penguins (Zoom Torino, Italy) and Magellanic penguins (Acquario di Genova, Italy) between 2012 and 2014. To determine which acoustic proprieties of vocalisations have the potential to discriminate between different individuals, sexes, and species, we measured temporal (e.g. duration), source-related (fundamental frequency, FO), and filter-related (formants) acoustic features of each vocal signal. The acoustic parameters were used to carry out a series of stepwise, permuted discriminant function analysis (with cross-validation). Our results showed that vocalisation could be classified according to the emitter, in a manner shown to be far greater than that attributable to chance. Moreover, we were able to determine the acoustic features that are potentially relevant for individual vocal recognition in both species. We also showed that species discrimination by calls is possible, despite the limited genetic distance between the African penguin and the Magellanic penguin. However, we failed to find sex-related vocal distinctiveness. Overall, we demonstrated that penguin calls can be studied by considering independent contributions from three different parts of the respiratory apparatus, namely lungs (temporal patterns), vocal production organ (source, determining the FO) and vocal tract (filter, responsible for formant peaks). Our results provide the first evidence that the source-filter theory can lead to a far better understanding of biologically meaningful information contained in nesting penguin calls. We suggest that this approach should be adopted to study vocal communication in other penguin species.

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The circadian vocal rhythm of a singing fish

ABSTRACT Biological rhythms enhance animal

survival and reproduction by synchronizing behavior and physiology to cyclical changes in the external environment. The hormone melatonin is the chemical expression of darkness in vertebrates, and plays a central role in entraining daily activity to the day-night cycle. Although regulation of cyclical locomotion and feeding behaviors has been well characterized, circadian and melatonin regulation of vocal behavior is not well understood. Knowledge of nocturnally vocal species is especially lacking, as diurnal songbirds are the predominant models for studying vocal behavior. We investigated the nocturnal courtship vocalization ("hums") of a highly vocal fish, the plainfin midshipman (*Porichthys notatus*). To test the hypothesis that hums are under circadian control, we recorded them from individual males held under normal light-dark (LD, 15:9) and constant dark (DD) cycles in artificial habitats mimicking natural conditions. The results strongly suggest that the daily cycle of midshipman vocalization is controlled by a circadian clock, although the strength of the clock varies across individuals. To test the hypothesis that melatonin stimulates midshipman vocalization, males who had been humming under LD were transitioned to constant light (LL) to suppress endogenous melatonin levels. On the day of transition to LL, one group was implanted with 2-iodomelatonin (2-Imel; potent melatonin receptor agonist) and another with vehicle control. Preliminary data suggest that humming activity decreases under LL in control-implanted and non-implanted males, but persists in 2-Imel-implanted males. Together, our results demonstrate for the first time a circadian rhythm in fish vocal behavior, and that melatonin action stimulates nocturnal vocal behavior. Knowledge of circadian and melatonin control of nocturnal vocalization in midshipman fish will complement investigations in diurnal birds and inform comparative investigations in other nocturnally vocal vertebrates. Support from NSF IOS1406515 and IOS1120925.

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Contexts of emission of ultrasonic vocalisations during social interactions in mice

ABSTRACT Social communication is heavily affected in patients with neuropsychiatric disorders. Accordingly, mouse models designed to study the mechanisms leading to these disorders are tested for this phenotypic trait, especially for ultrasonic vocalisations during social interactions. Nevertheless, little is currently known on the precise contexts of emission of these ultrasonic vocalisations during social interactions. Therefore, in the present study, we aimed at synchronising the analyses of ultrasonic vocalisations and specific events in social interactions during male-male interactions in freely moving animals (occupant / new-comer). We tested 8 pairs of male mice in free dyadic social interactions, in three cage formats (rectangle, round, square). Under these conditions, we examined the emission of ultrasonic vocalisations during the different types of social contacts, approach-escape sequences, follow behaviour, and the time each animal spent in the vision field of the other one. We did not highlight any significant effect of cage shape / size on the number of ultrasonic vocalisations recorded as well as on the behavioural events examined. In contrast, we showed that vocalisations were emitted during specific behavioural sequences, especially during close contacts or approach behaviours. A large proportion of these vocalisations (30- 50%) occurred when the occupant was behind the new-comer. The types of ultrasonic vocalisations emitted also varied according to the behavioural events in which they were emitted. The present study provides new information about the context of emission of ultrasonic vocalisations in a protocol reliably eliciting social contacts in adult male mice. This knowledge will be valuable in standardizing investigation of social interactions in mouse models of neuropsychiatric disorders.

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Wildlife presence in a rural soundscape near a wind turbine

ABSTRACT Studies of wind turbine noise yield generous amounts of low quality sound data in various environments. In the present context, audio