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► **To cite this version:**

Charlotte de Mouzon, Caroline Gilbert, Romain Di-Stasi, Gérard Leboucher. Vocal communication in human-cat relationship. Colloque de l'institut francilien d'éthologie (IFE), Dec 2021, Villetaneuse (Université Paris 13), France. hal-04510184

HAL Id: hal-04510184

<https://hal.science/hal-04510184>

Submitted on 26 Mar 2024

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Vocal communication in human-cat relationship



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Introduction

In Western cultures, humans use a specific speech to talk to their pet companions. Pet directed speech (PDS) shares prosodic features of infant directed speech (IDS), used when talking to young children. These characteristics include elevated pitch and increased pitch variation, compared to the typical adult-directed speech (ADS) (Burnham et al. 1998; Jeannin et al. 2017). It has been hypothesised that pitch is elevated in IDS and PDS in order to attract the listener's attention, possibly motivating affiliative interaction with the speaker (Benjamin & Slocombe 2018).

Most studies have addressed PDS in dogs but little in cats. In this study, we investigated how humans talk to cats. We hypothesised that humans use a particular speech when talking to cats, as they do to address babies and dogs. We tested this hypothesis by evaluating whether acoustic characteristics of cat-directed speech (CDS) differ from those of ADS.

Methods

STUDY 1: Lecdd

Participants

32 men and women (21 ± 0.4 yrs) were recruited among students of Nanterre University.

Recording and Acoustic analysis

16 cat-videos (20 seconds duration) were used to elicit speech. Each video was seen only once by a man and once by a woman. Cat's name were used by each participant to measure both ADS and assumed CDS.

Statistics

Because all data did not follow statistical normality (Shapiro-Wilk test for normality $p < 0.05$), non-parametric Wilcoxon signed rank test were used to compare acoustical characteristics of ADS and CDS utterances (Siegel and Castellan 1988).

STUDY 2: EnvA

Participants

15 women cat owners (22.4 ± 0.16 yrs) were recruited among students of EnvA.

Recording and Acoustic analysis

Speech was elicited through direct human-cat interaction. Participants spoke to their own cats. 4 types of sentences were recorded through playing, feeding, separation and reunion conditions.

Statistics

Linear mixed-effects models (LMM) were used to analyse the effect of speech register (ADS vs. CDS) and phrase types. P-values were calculated using the *PermTest* function of the R package *pgirmess* and compared to alpha risk (Bonferonni sequential correction) for post-hoc analysis.

Variables measured (PRAAT software)

Mean F0: Average fundamental frequency of the speech over the duration of the signal (pitch)

FOCV: Coefficient of variation of F0 over the duration of the signal (it is a measure of pitch modulation)

IntCV: coefficient of variation of intensity (represents the energy in the sound).

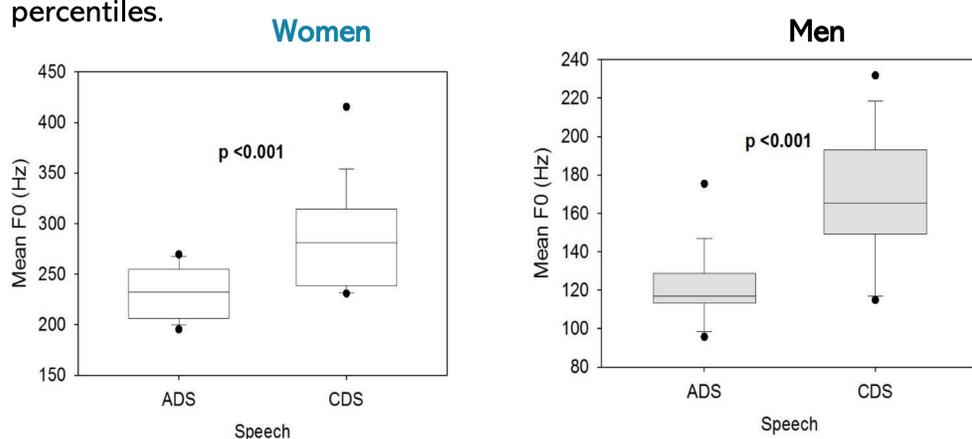
STUDY 1

Results

STUDY 2

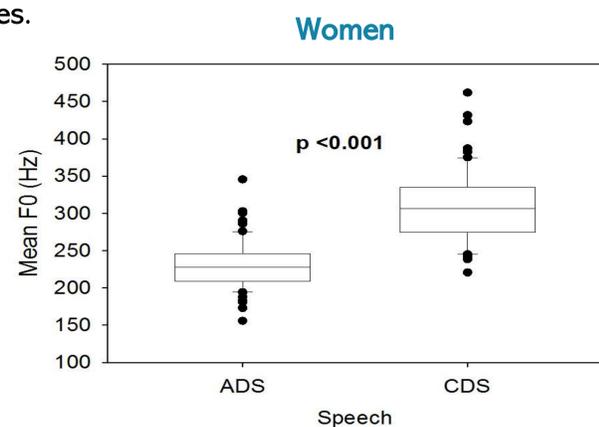
Figure 1. Fundamental frequency in ADS and CDS.

$n = 32$ (16 women, 16 men). Error bars represent the 5th and 95th percentiles.



Other results: there was a significant difference between ADS and CDS for IntCV for women ($p = 0,019$) but not for men. There was no difference in FOCV for ADS and CDS for men and women.

Figure 2. Effect of speech register ADS vs CDS on fundamental frequency. $n = 15$. Error bars represent the 5th and 95th percentiles.



Other results: There was no difference in intensity (IntCV) nor in modulation of speech (FOCV) for ADS and CDS (data not shown)

Conclusion

In our study cohorts, participants had a higher pitch in CDS than in ADS condition regardless of their gender. However, the variation of intensity (IntCV) was gender specific with women in our first experiment having a significantly higher IntCV in CDS than in ADS condition.

Overall, this study confirmed our hypothesis for a Cat-Directed Speech, differing from ADS on an acoustical point of view. These results should be interpreted in light of latest research on human – cat communication and attachment, paralleling to some extent the parent-child relationship.

References: Benjamin, A., & Slocombe, K. (2018). 'Who's a good boy?!' Dogs prefer naturalistic dog-directed speech. *Animal Cognition* 21, 353–364; Burnham, D., Kitamura, C., & Vollmer-Conna, U. (2002). What's new, pussycat? On talking to babies and animals. *Science* 296,1435; Jeannin, S., Gilbert, C., & Leboucher, G. (2017b). Effect of interaction type on the characteristics of pet-directed speech in female dog owners. *Animal Cognition* 20, 499–509.

Acknowledgements:

We would like to thank Laetitia Matray, Chloe Tavernier and Benoit Janicot for their help with the set up and data collection, & members of the Lecdd for their participation at different stages of the study. Thanks to MARTIN SELLIER® for their financial support.