



Sex differences in black-capped chickadees' (*Poecile atricapillus*) *tseet* calls

Colleen Wyering; Hadeel Mohamed; Kimberley A. Campbell; Christopher B. Sturdy
Department of Psychology, Neuroscience and Mental Health Institute, University of Alberta



Background

- The black-capped chickadee (*Poecile atricapillus*) is a common songbird native to North America
- Songbirds have two categories of vocalizations: **songs** (used for mate attraction and territory defence) and **calls** (used for numerous, varied situations)
- Contrary to most songbirds, chickadees have simple songs and relatively complex calls
- *Tseet* calls are commonly produced, short duration calls used between birds to communicate their locations when they are short distances apart

Research Question

Do the *tseet* calls of male black-capped chickadees differ from those of females in terms of frequency and duration?

Methods

- Vocal recordings were done in sound attenuating chambers to obtain natural vocalizations
- Twenty-two *tseet* calls were randomly selected from available vocalizations for each of 32 black-capped chickadees (16 males, 16 females)
- Using SIGNAL v5, the *tseet* calls were standardized to 300 ms in length and seven different acoustic features were measured (see Figure 1)
- A sex \times feature ANOVA was run on each of the seven acoustic measures
- The critical *p*-value was corrected to account for multiple comparisons (Bonferroni Correction)

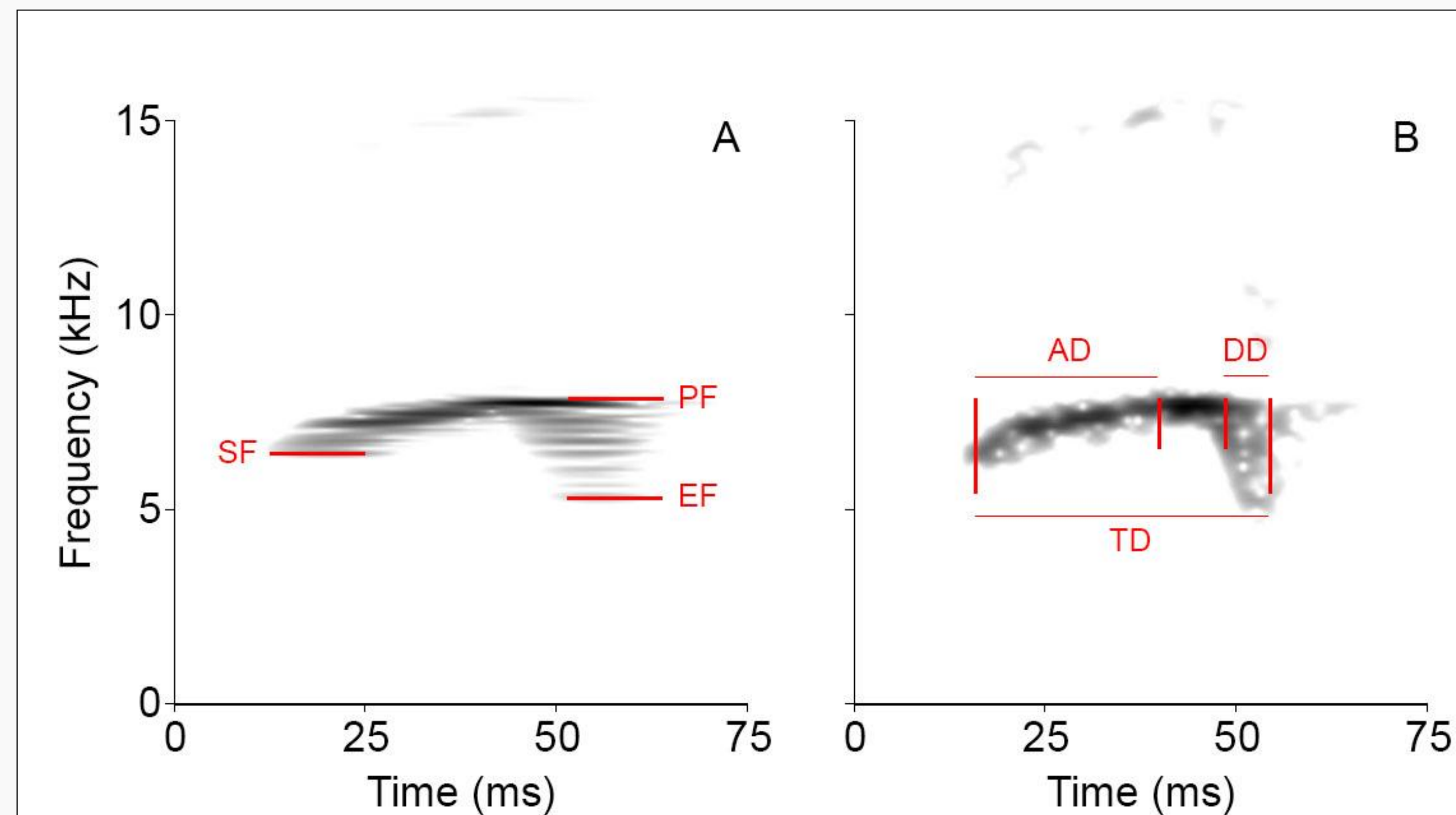
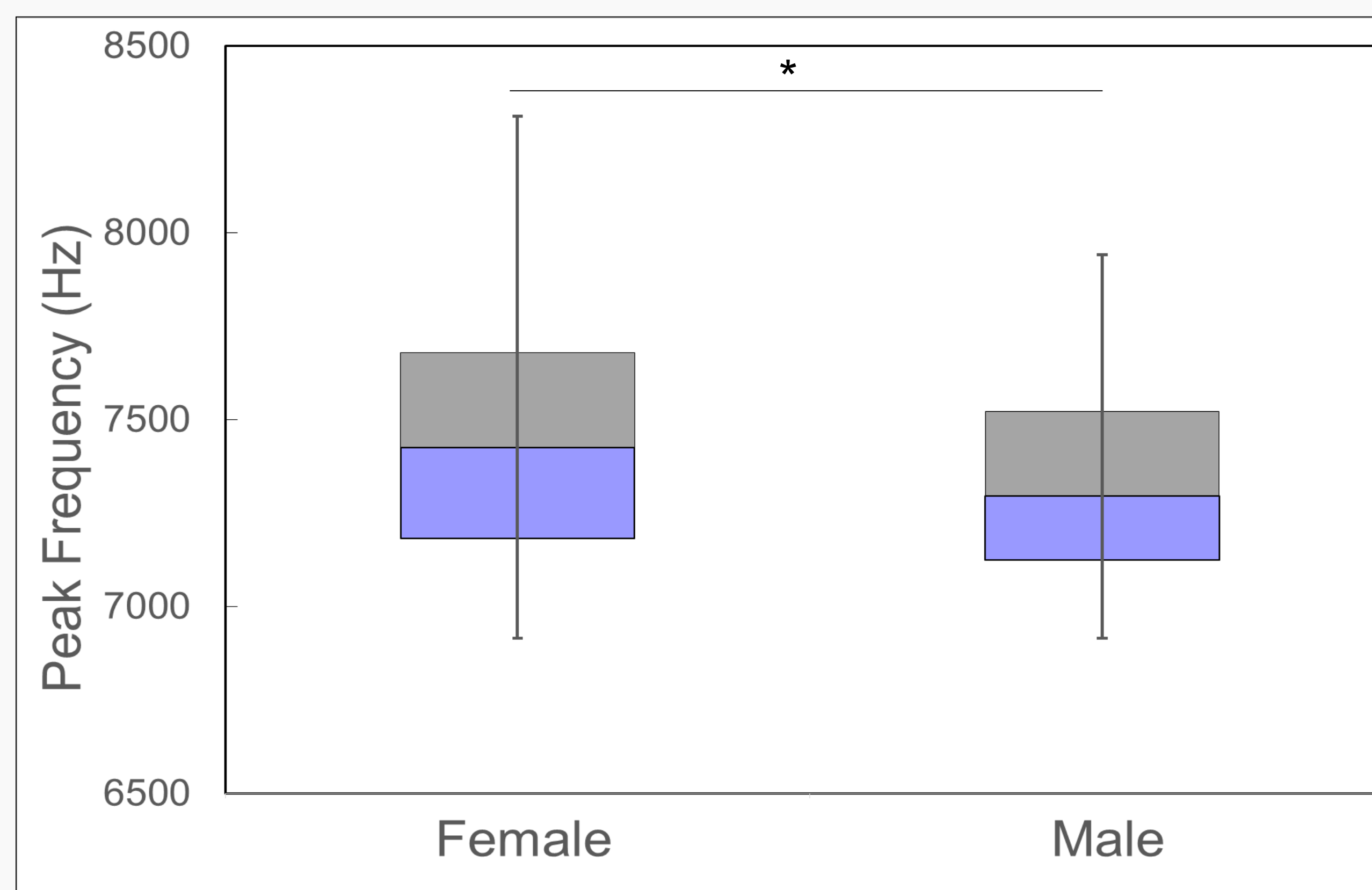
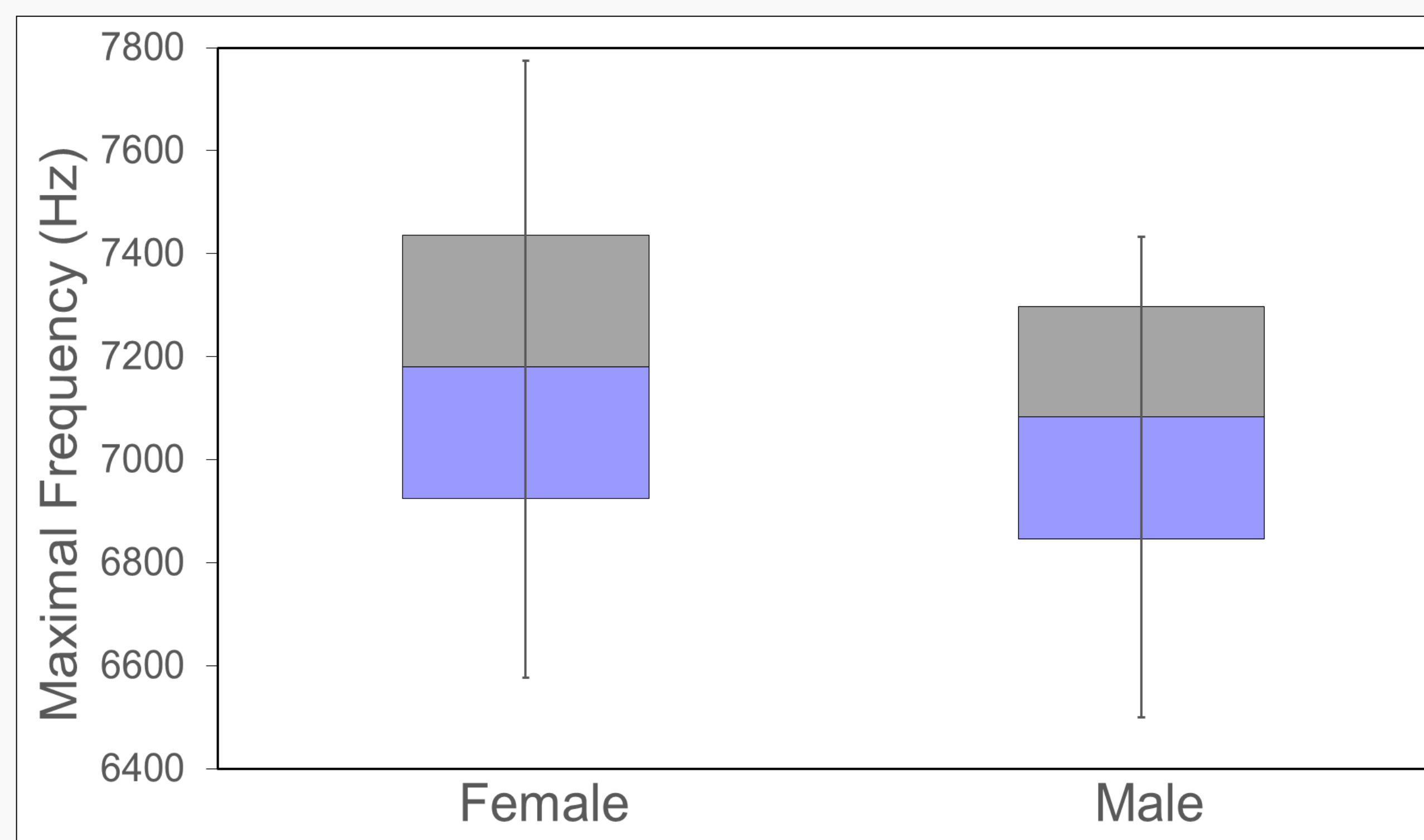


Figure 1: Acoustic measures made on *tseet* calls. (A) Spectrogram optimized for frequency precision showing measures for start frequency (SF), peak frequency (PF), and end frequency (EF). (B) Spectrogram optimized for duration precision showing measures for ascending duration (AD), descending duration (DD), and total duration (TD).

Results



Female chickadees produce *tseet* calls with higher peak frequency than males ($p < 0.001$)



Female chickadees produce *tseet* calls with higher maximal frequency than males ($p = 0.014$, NS)

Conclusions

- Our results show a correlation between the sex of a chickadee and the peak frequency and the maximal frequency of the *tseet* calls it produces
- These results corroborate a study by Guillette et al. (2010) which found sex differences in black-capped and mountain chickadee *tseet* calls
- These results contrast an ongoing study which found no sex difference in the A notes of *chick-a-dee* calls despite their similar acoustic structure to *tseet* calls, which suggests the difference is a matter of function
- Since female chickadees tend to be smaller than males, the differences in frequency may also be due in part to differences in body size

Citations

Guillette, L. M., Bloomfield, L. L., Batty, E. R., Dawson, M. R. W., & Sturdy, C. B. (2010). Black-capped (*Poecile atricapillus*) and mountain chickadee (*Poecile gambeli*) contact call contains species, sex, and individual identity features. *The Journal of the Acoustical Society of America*, 127(2), 1116–23.
Photos: Kimberley Campbell (right)
(left) https://www.allaboutbirds.org/guide/PHOTO/LARGE/black_capped_chickadee_10.jpg

Acknowledgements

