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Effects of Urbanization on House Sparrow *(Passer domesticus)* and House Finch *(Haemorhous mexicanus)* Song Propagation

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INTRODUCTION

- Bird senders produce signals that are filtered by the environment then received[1]

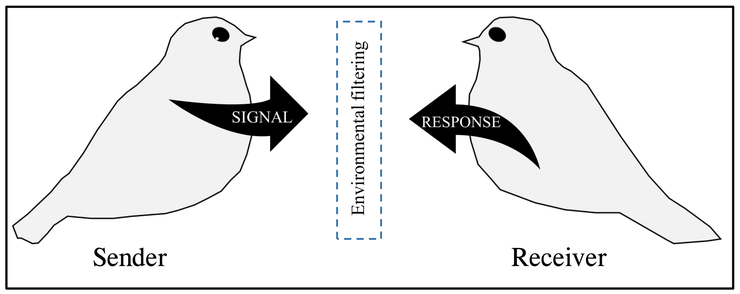


Figure 1. Visual of bird communication.

- Environmental factors such as noise pollution can affect communication[2]
  - Increases in noise pollution are associated with an increase in song frequency and song amplitude[3]
- Bird song is affected by the environment and ambient noise

METHODS

- Obtained song recordings of house sparrows and house finches
- Played back songs at urban, suburban, and rural locations at 1m, 5m, and 10m-100m
- Compared song degradation across distance and habitat type

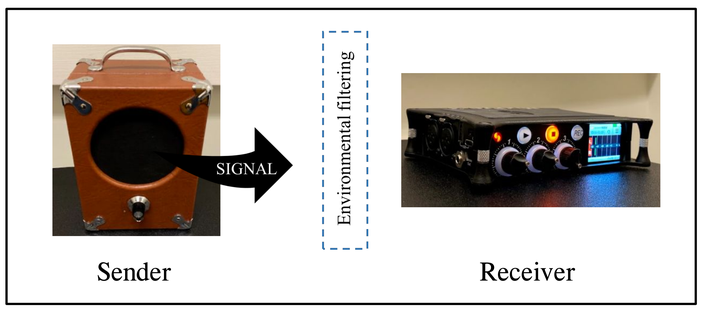
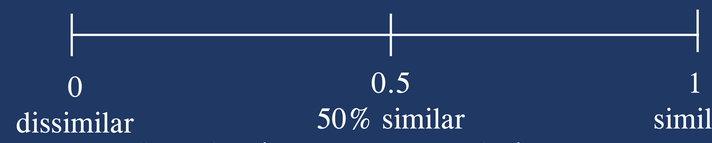


Figure 2. Visual of experimental set-up.

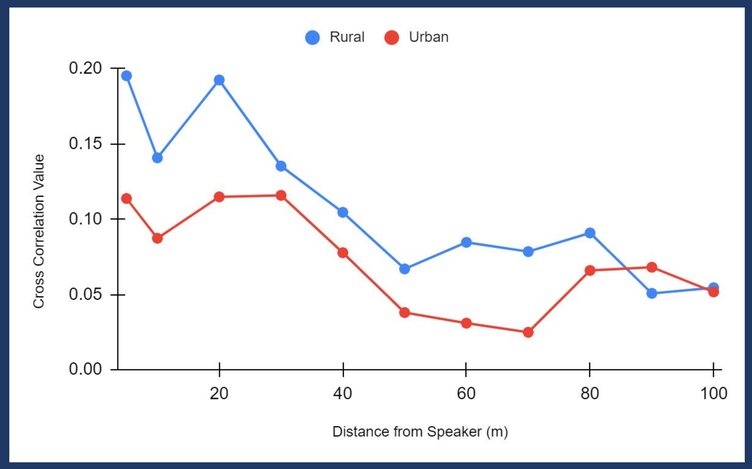
Research Question: How does environmental filtering affect the sound propagation of bird song?

Prediction: We expect more similarity between waveforms in rural environments compared to urban

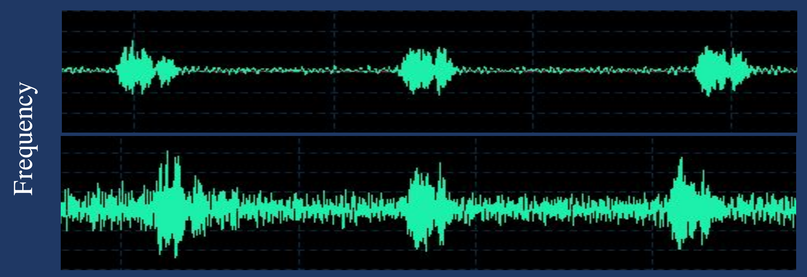
PRELIMINARY RESULTS



Data was analyzed using cross-correlation, a measurement of the similarity between two waveforms on a 0-1 scale



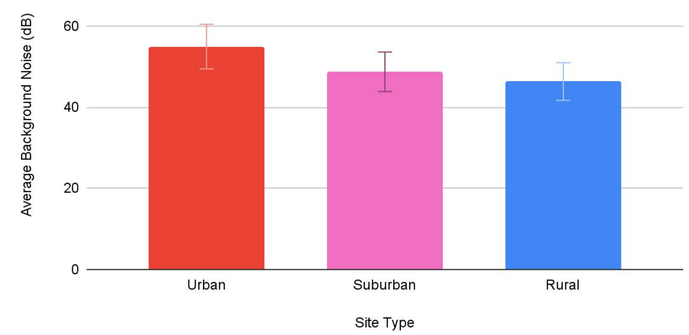
Single song exemplar from 7th St. (urban) and the ODC (rural). Song appears more similar at rural sites compared to urban



HOSP 4, 5, and 6 at the ODC (top) and 7th St. (bottom)

URBANIZATION DATA

Field trial sites around Holland, Michigan



Background noise measurements revealed urban sites had higher ambient noise than rural sites

DISCUSSION

- Song waveforms tend to be most similar in rural areas[4] and have lower attenuation[7]
- Ambient noise makes signals less distinct[5]
- Active space is reduced in high noise areas[6]
- Our preliminary data suggests there is potential for urbanization to negatively impact bird communication

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