



RESEARCH ARTICLE

Vocalization As a Predictor of Stress Level Between Sex in Goose Models (A Hypothesis)

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Abstract

Aims: This article was written in order to propose a model of analyses between a male and a female vocalizations in goose species (when respond to the environmental stressor) as a predictor of the level of stress based on the theory of correlation between vocal and emotion [1].

Method: Experimenter came to near cage of one couple of Gooses suddenly as an environmental stressor (please see the video as a supplementary material). Samples vocalization and avoidance behaviors that accompany the male and female goose were recorded by using a Canon A2300 camera. Recordings of male and female vocal samples cut to take the same length of duration was 0.508 seconds per one signal by using the Cool Edit Pro 2.0 software. Variables acoustic of sample pieces then analyzed by using Praat linguistic software version 1.6 Styler.

Result and conclusion: The level of the stress responses was tend to be higher in male than female. An example of this method can be used for comparative studies of stress level on populations of other species or to humans by observing the different cultural characteristics and other oral habits.

Background

In verbal species, an environmental stressor such an arrival of the foreign species were greeted with avoidance behavior could accompanied by vocalizations. According to the theory Scherer [2], avoidance behaviors that are assumed as a response to stress or affection impaired can be analyzed based on the characteristics accompanying vocalizations. Here we demonstrate it by using Goose Models. According Styler [3], Praat software version 1.6 can be used to analyze a wide range of linguistic phenomena including formant characteristic vocalizations such F0- F4, and it was still rarely possessed audio analysis software in previous generation.

Method

Experimenter came to near cage of one couple of Gooses suddenly as an environmental stressor (please see the video as a supplementary material). Samples vocalization and avoidance behaviors that accompany the male and female goose were recorded by using a Canon A2300 camera. Recordings of male and female vocal samples cut to take the same length of duration was 0.508 seconds per one signal by using the Cool Edit Pro 2.0 software. Variables acoustic of sample pieces then analyzed by using Praat linguistic software version 1.6 Styler. Variables vocalization analyzed were the intensity, F0 (fundamental frequency), the number of pulses per duration, F4, and the distance between F0 to F4 or F4-F0 (formant

bandwidth). The results of the analysis will be discussed with the theory of human emotions [1] comparatively.

Results and Discussion

The Intensity of male was lower than female. The vocal F0 (pitch) of male was greater than female. The number of pulses in male vocal was greater than female, and the formant bandwidth of male vocal was lower than female (**Table 1**).

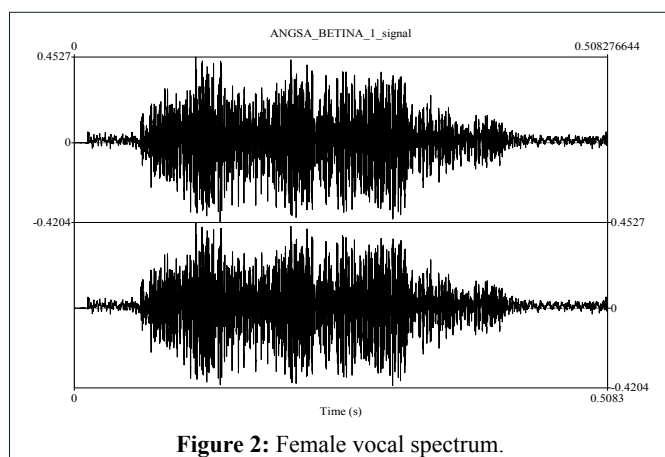
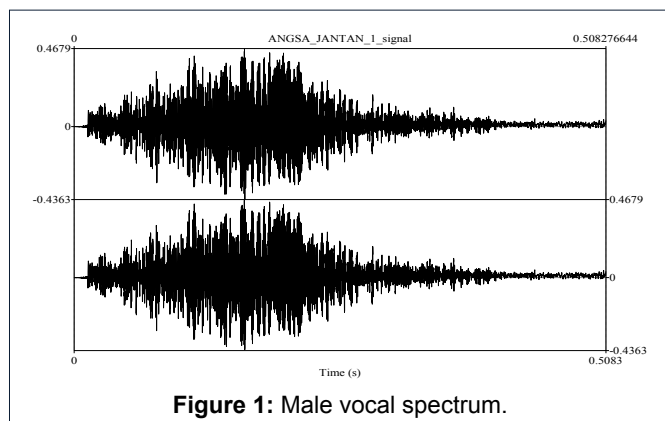
According to the theory of correlation vocals and emotions in humans [1], the tendency of stress levels higher can be characterized by vocal characteristics with the larger number of pulses or syllable, larger F0, greater intensity, and smaller in formant bandwidth (F0-F4) (**Figures 1, 2**).

Variable	Male	Female
Duration	0,508 seconds	0,508 seconds
Intensity	74,994 dB	75,713 dB
Pulse	49	36
F0 (pitch)	195,198 Hz	158,0999 Hz
F4	3408,431 Hz	3514,807 Hz
F4-F0	3213,233 Hz	3356,707 Hz

Table 1: Acoustics Analyses of Vocalization.

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If the theory of Scherer followed by the 3 or 75% of 4 diagnostic results indicate that ‘the level of the stress responses was tend to be higher in male than female’ because it meets the criteria of vocal characteristics of the larger number of pulses, larger F0, and smaller in formant bandwidth (F0-F4). One other criteria that the intensity did not supported the indication due to the male vocal intensity slightly lower than female.

In non-human primates, Gibbons with higher androgen levels produced calls having higher pitch [4]. This method can be equipped with a future correlation study between the vocal acoustic character with the amount of cortisol in the stool to get a more accurate picture of the physiological stress response occurs.

Conclusion

An example of this method can be used for comparative studies of stress level on populations of other species or to humans by observing the different cultural characteristics and other oral habits. To confirm the findings in this study sample would still need a lot of replication, especially in terms of the number of subjects.

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