The Acoustic Features of Nonverbal Vocal Signals of Emotion

Nonverbal vocal expression of emotion is a fundamental element of human communication, but research has yet to robustly demonstrate how these vocalisations' acoustic features facilitate emotion recognition. This study aimed to describe the relationship of these acoustic features to emotion category and perceived arousal. It hypothesised that nonverbal emotional vocalisations function as categorical signals, and developed a predictive model for the acoustic features of six basic emotions. The study further hypothesised that perceived arousal is related to the clarity of signalling, and therefore that arousal ratings will be associated with exaggerated acoustic features. 60 participants spontaneously generated 922 nonverbal vocalisations, which were analysed using Praat software. Vocalisations were identified and rated on recognisability and arousal scales by two participants. Repeated measures ANOVAs showed significant differences between the frequencies of the first three formants for vocalisations from different emotion categories, suggesting that different vowel sounds are associated with different nonverbal emotional signals. There were also significant differences in other acoustic features between different emotions, the majority of which supported the model's predictions. Arousal, accuracy and recognisability were significantly correlated, but arousal did not have a robust relationship with extreme vocal features. Post-hoc analysis revealed a weak correlation between HNR and arousal across all vocalisations, suggesting HNR may be an index of vocaliser arousal. This study provided the first empirical evidence of communication using vowel sounds in human nonverbal emotional expressions. These findings provide context for further investigation of emotional communication, and for comparisons with musical emotional expression.