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**Vocalizations of the Spotted Hyena (*Crocuta crocuta*): Eliciting  
Acoustic Variation in Groans**

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Spotted hyenas (*Crocuta crocuta*) are highly social animals possessing a complex vocal repertoire. Vocal signals of different types correlate with distinct social circumstances. Groans constitute a very large category in the spotted hyena repertoire which is not well understood. Sounds labeled as groans vary in their acoustical quality from more growling sounds to more tonal vocalizations. Groans are also elicited in many different social interactions. To begin to decipher the meaning of these vocal signals, we examined how the variation in the acoustic properties of groans was correlated with experimentally controlled eliciting conditions. Groans were elicited in adult hyenas presented with three objects: unfamiliar spotted hyena cubs, meaty bones, and the empty transport cage used to contain bones or cubs on other trials. Cubs elicited more groans from more adults than other objects but all objects elicited vocal responses. More importantly, discriminant analysis revealed differences in the acoustic characteristics of groans elicited by cubs and those elicited by other objects. Cubs elicited more prolonged and more tonal groans with higher fundamental frequency. Our study shows that groans can be classified into different groups and that these different sounds were produced in different behavioral contexts.