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Appendix A from S. Lingle and T. Riede, "Deer Mothers Are Sensitive to Infant Distress Vocalizations of Diverse Mammalian Species"

(Am. Nat., vol. 184, no. 4, p. 000)

Playback Stimuli and Responses to These Stimuli

Audio Files: Examples of Playback Stimuli

Audio file A1: Call of a mule deer fawn, not manipulated (fig. A1*A*).

Audio file A2: Call of an eland calf, not manipulated (fig. A1*B*).

Audio file A3: The same call of an eland calf as in audio file A2, with the fundamental frequency (F0) increased by a factor of 5.5. (fig. A1*C*).

Audio file A4: The same call of an eland calf as in audio file A2, with the F0 increased by overriding the original sampling frequency (fig. A1*D*).

Audio file A5: Call of a silver-haired bat pup. The sound files were manipulated by overriding the sampling frequency (fig. A1*E*).

Audio file A6: Call of a yellow-bellied marmot pup. Individual calls were not manipulated, but the time lapsing between calls was increased from the original recording (fig. A1*F*).

Audio file A7: Call of a 6-week-old human infant. The time lapsing between calls was increased from the original recording (fig. A1*G*).

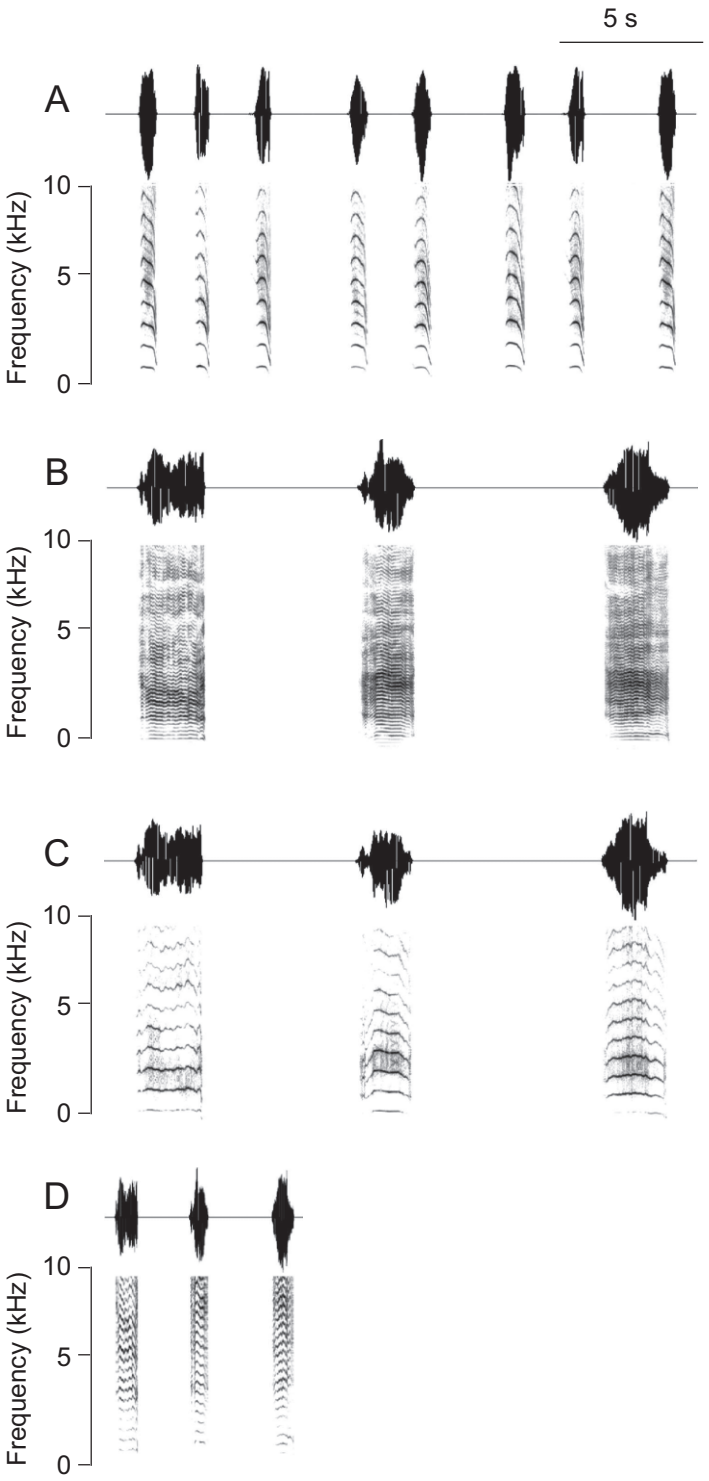
Audio file A8: Call of a different human infant at 1 week in age. The time lapsing between calls was increased from the original recording (fig. A1*H*).

Audio file A9: Call of infant cat (fig. A1*I*).

Audio file A10: Sine wave stimulus (fig. A1*O*).

Audio file A11: Natural mule deer distress call that was used as exemplar for a synthesized distress call (audio file A12) and the sine wave stimulus (audio file A10).

Audio file A12: Synthesized mule deer distress call, which was modeled on the natural distress call included in audio file A11.

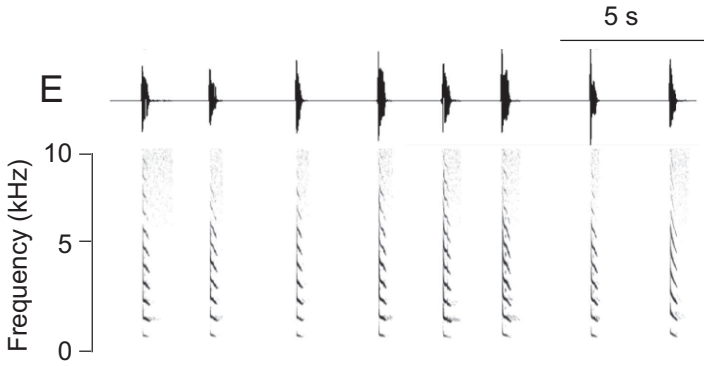


Eight calls of a mule deer fawn, not manipulated.

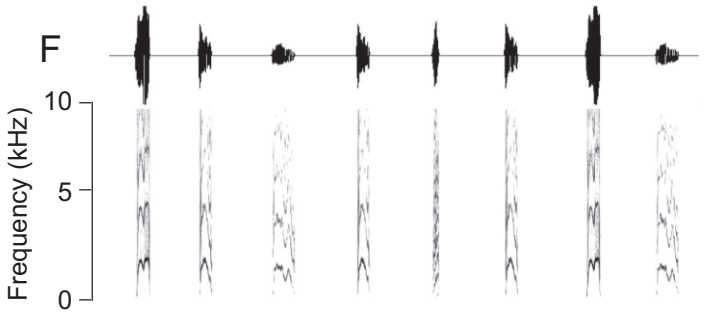
Three calls of an eland calf, not manipulated.

The same three calls of an eland calf as shown in b The fundamental frequency was increased by a factor of 5.5.

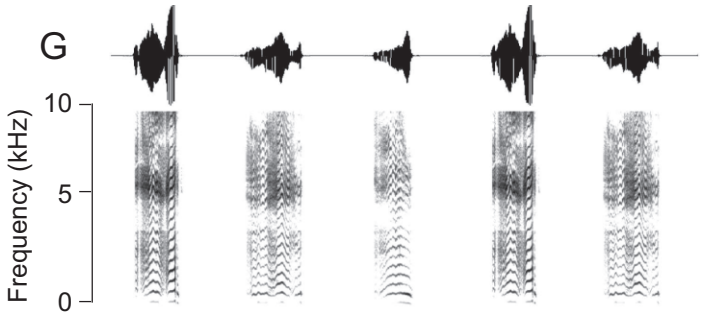
The same three calls of an eland calf as shown in b. The sound files were manipulated by overriding the sampling frequency. This resulted in an increase in fundamental frequency and a shortening of call duration.



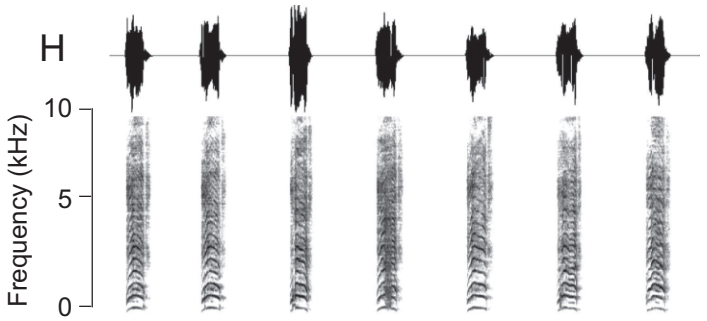
Eight calls of a silver-haired bat pup. The sound files were manipulated by overriding the sampling frequency. This lowered the fundamental frequency and increased the call duration.



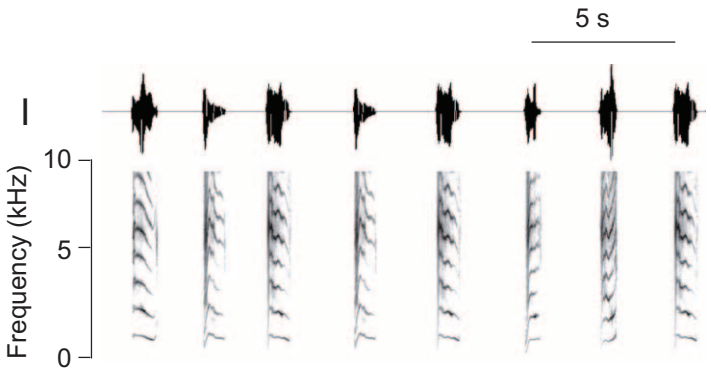
Eight calls of a marmot pup. Individual calls were not manipulated, but the time lapsing between calls was increased.



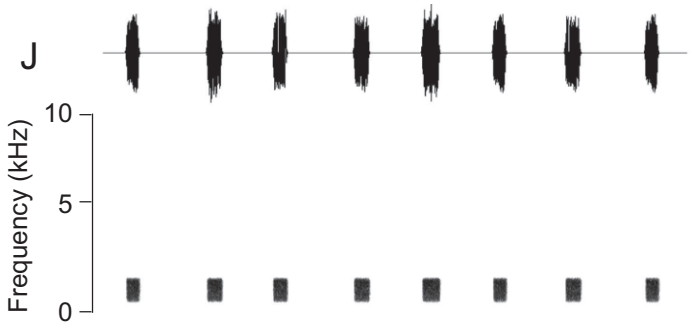
Five calls of a human infant. Individual calls were not manipulated, but the time lapsing between calls was increased.



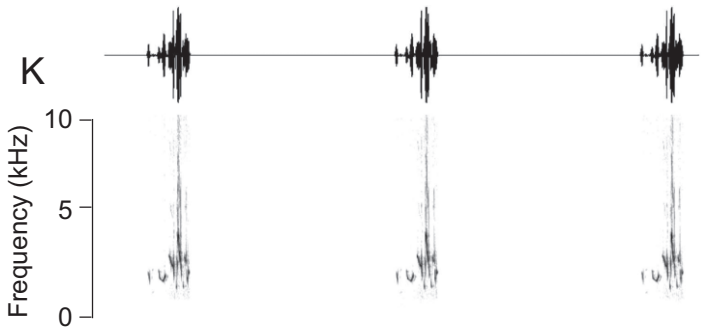
Seven calls of a different human infant Individual calls were not manipulated, but the time lapsing between calls was increased. These calls were very noisy in contrast to the sample in g.



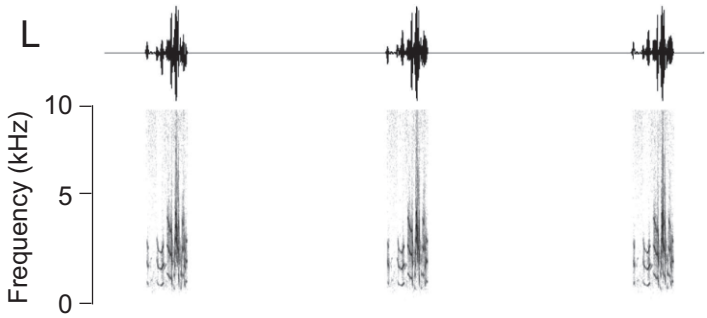
Eight infant cat calls.



Eight white noise sounds that were bandpass filtered between 400 and 1500 Hz.



Three original meadowlark songs.



Three meadowlark songs with F0 reduced by 0.5

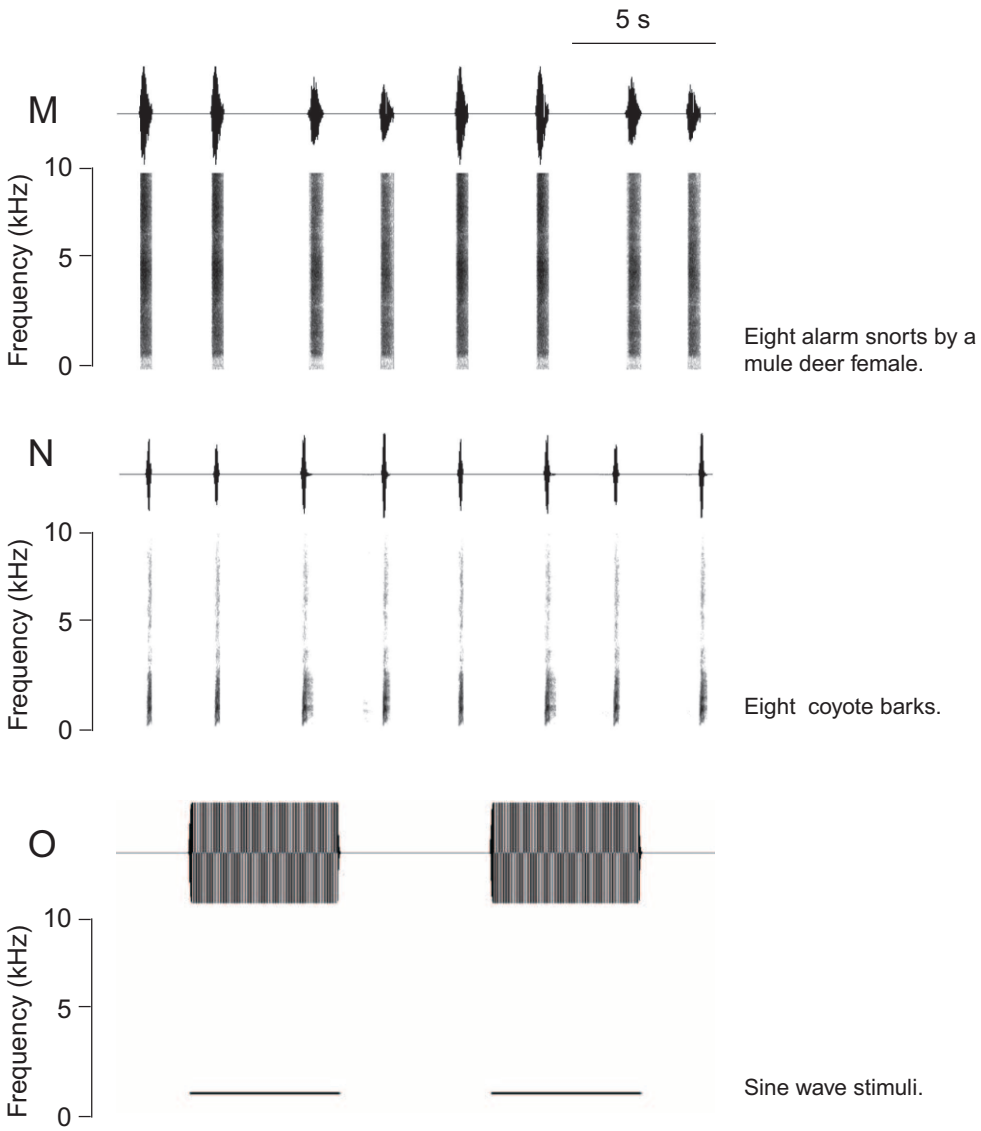


Figure A1: Selection of playback stimuli used in this study, with the oscillogram shown above the spectrogram for each. *A–I*, Distress vocalizations: *A*, mule deer distress calls (audio file A1); *B*, eland distress calls (audio file A2); *C*, eland distress calls with the F0 shifted by multiplying the F0 contour by 5.5 (audio file A3); *D*, eland distress calls with the F0 increased by overriding the original sampling rate (audio file A4); *E*, silver-haired bat isolation calls with the F0 lowered by overriding the original sampling rate (audio file A5); *F*, marmot distress calls (audio file A6); *G*, human infant cries (audio file A7); *H*, cries of a different human infant (audio file A8); *I*, calls of an infant cat (audio file A9). *J–O*, control sounds: *J*, white noise (band-pass-filtered 400–1,500 Hz); *K*, unaltered meadowlark songs; *L*, meadowlark songs with F0 reduced by 0.5; *M*, alarm snorts of a female mule deer; *N*, coyote barks; *O*, sine wave stimulus with mean F0 matched to mean F0 of a mule deer fawn (audio file A10). Distress vocalizations were distributed so that there would be approximately 4–7 s of vocalization during 20 s of a playback stimulus, to a maximum of eight calls per 20 s.

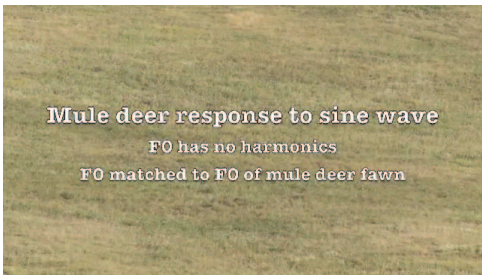
Video Files: Examples of Responses to Playback Stimuli

Flash versions on this page are for fast Web viewing; for highest quality, please download original versions using the links.

Videos A1–A6: Still images from videos A1–A6. *A1*, Setting up and testing the speaker (video A1). The person operating the speaker avoided exposing her- or himself to subjects by remaining hidden by topography or vegetation. If the person was not concealed, s/he "belly-crawled" the speaker into place. The speaker operator had headphones to hear the observer's voice without being overheard by the deer. The speaker operator communicated with the observers only by clicking the radio and not by speaking. *A2*, Mule deer response to original eland call (video A2). As shown in this video, subjects alerted but did not approach the speaker when the unmanipulated eland calls were played. This subject remained alert as long as the calls were played. *A3*, Mule deer response to eland call with the fundamental frequency (F0) manipulated into the mule deer response range (video A3). Mule deer responded intensely to eland calls that had the F0 manipulated either by multiplication, as was the case for calls played during this video, or by overriding the original sampling frequency. *A4*, Mule deer response to cry of human infant (video A4). This female and fawn moved from a distance of 150 m to within 25 m of the speaker. *A5*, Mule deer response to isolation calls of juvenile cat (video A5). This female approached the speaker rapidly in response to the sound of a kitten. When near the speaker, she displayed defensive behavior and was heard to grunt. *A6*, Mule deer response to manipulated bat call (video A6). Female moves rapidly to speaker. She remains within 10 m of speaker for the duration of the trial. The speaker person, hidden in the vegetation patch to the right of the patch the speaker was in, did not hear her grunt.

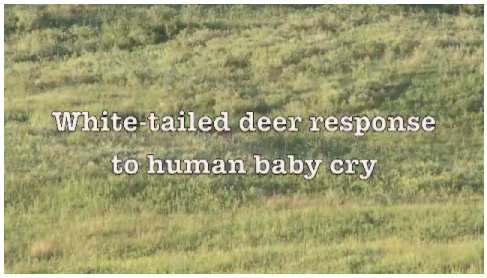
A7

A8



A9

A10



A11

Videos A7–A11: Still images from videos A7–A11. *A7*, Mule deer response to isolation calls of juvenile dog (video A7). Despite being slow to begin her approach, the main subject moved 97 m from her original location, which was more than 200 m from the speaker, resulting in a response scored as "5," or moderate. *A8*, Mule deer response to sine wave stimulus (video A8). This stimulus has a mean fundamental frequency (F0) matched to that of a natural mule deer distress call. Female alerts but does not approach. *A9*, Mule deer response to coyote bark (video A9). Female alerts by looking toward the speaker but does not get up or approach. A mule deer distress call is played 30 min later, resulting in a strong response. *A10*, White-tailed deer response to fur seal call (video A10). White-tailed deer female moves rapidly to speaker as it plays contact calls of a subantarctic fur seal pup. *A11*, White-tailed deer response to cry of a human infant (video A11). This female moved about 40 m closer to the speaker from a starting distance of 175 m, resulting in a response scored as "5," or moderate.