

Methods – extended details

Animals and training. Four adult *P. kuhlii* were captured in an abandoned industrial building in Beit-She'an, Israel (32°30'N, 29°35'E). Bats were held in a wooden box, in reversed light/dark cycle and a temperature controlled environment. In the flight room (see below), food was offered on an elevated wooden platform (120 cm above the floor) at a different, random location in the flight room, and the bats were allowed to fly freely in the room for two hours every day. All bats quickly learned to land on the platform and feed from it. The flight room in these sessions was either obstacle-free or cluttered (with vertical strings, see methods).

Jamming signals. Jamming signals were produced in the following manner: each individual was flown in the flight room with no playback and no other bats present. 20 randomly selected calls for each bat were arranged in a sequence. We made sure that all calls had high SNR and equalized their intensity. Because we aimed to simulate a situation of searching in a group, we did not select short calls (<2ms) which are typically emitted by approaching bats. We added a low-frequency (2-5kHz, below the bat's hearing range) sinusoidal audio label to each call to ease distinguishing real bat calls from play-back calls in the analysis (see below).

Echolocation analysis. We used an in-house Matlab (Mathworks, Inc.) script for parameter extraction. First, for each time interval of 200ms, the microphone with the highest SNR was chosen (of the 12 microphones) to ensure best possible data. The microphones were positioned in front of the speakers (pointing towards the center the room) and they thus amplified the bat calls which were directed towards them and attenuated the playback calls which were played from behind. Because of the spatial arrangement of the speakers and microphones, the calls emitted by the real bat were mostly louder than playback calls in the recordings (Fig. 1B). This ensured that the selection of high SNR channels (see above) was with respect to bat SNR and not playback SNR. Next, we excluded the jamming signal from the recordings using the low-frequency audio-label which was added to the playback calls (see above). This procedure allowed us to automatically detect bat calls between the jamming sequences. We estimated call intensity as the peak-to-peak maximum amplitude of the call. We did not

compensate for the distance of the bat to the microphone; however, because we had microphones all over the room and for each call we selected the microphone with the loudest recording, this estimate of call intensity is reasonable for comparing different conditions. Bats average distance from the microphones was similar under different treatments as they covered the room similarly in flight (see methods).