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Auditory-guided reaching movements in the peripersonal frontal space

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Previous studies on auditory localization processes have shown that humans can localize sound sources accurately, including distance in certain situations. Few studies have examined auditory localization by binaural mechanisms in the peripersonal space. Numerous studies have examined auditory localization through verbal report or various pointing movements. This study examines the precision of hand "reaching" movement towards an auditory object. An experimental platform (semicircle, radius 1m) was constructed with 35 small loudspeakers placed under an acoustically transparent grid. Blindfolded subjects were seated within the platform at table height. Test protocol consisted of a brief audio stimulus presented via a single loudspeaker followed by the subject placing their index finger (preferred hand) at the location of the sound object. Optical finger tracking was used during the course of the experiment. Two test variables were investigated: different audio stimuli, Gaussian noise bursts varying the number and the duration of each burst; room acoustic conditions, with and without acoustical damping for reflection suppression. Preliminary results show precision of localization does not grow indefinitely with the number of burst repetitions but reaches a limit. Azimuth precision remains accurate, even with short burst conditions, contrary to the distance perception which increases with the stimuli duration.