Perceptual limits in a simulated “Cocktail party”

Numerosity judgments of simultaneous talkers were examined. Listeners were required to report the number of talkers heard when this number varied (1 to 13). Spatial location of talkers (1 or 6 locations), duration of talker voices (0.8 s, 5.0 s, and 15.0 s), and gender arrangement of talkers also were manipulated in four experiments. In all experiments, the proportion of correct numerosity judgments monotonically decreased as talker numbers increased. Perceptual limits, defined as talker numbers with proportion correct scores of 0.5, varied between 3 to 5 talkers, on average, depending on listening conditions, and were significantly higher for spatially separated talkers, for the longer voices, and for the mixed gender voices (Experiments 1, 2, and 3). In addition, Experiment 4 found that average numerosity response times increased monotonically over a range of one to four talkers. These results support the idea that, before counting talkers, listeners perceptually segregate talkers to render numerosity judgments. They also suggest that our functional auditory world for simultaneous voices may consist of, at most, three to five talkers depending on listening situations. In light of these results, possible causes for such perceptual limits are discussed.


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