

ACOUSTICS2008/3414
The localization of multiple simultaneous sounds is mediated by attention

Brian Simpson^a, Douglas Brungart^a, Robert Gilkey^b, Nandini Iyer^a and James Hamil^c

^aAFRL, 2610 Seventh Street, WPAFB, OH 45433, USA

^bWright State University, Department of Psychology, 335 Fawcett Hall, Dayton, 45435, USA

^cOhio State University, Department of Electrical Engineering, Columbus, 43210, USA

Real-world listening experiences suggest that listeners possess a much greater ability to recover spatial information from multiple simultaneous sounds than would be predicted from the results of most multisource listening experiments. Recent data from our laboratory are consistent with these real-world experiences, and indicate that listeners can reliably report the location of a sound that has been deleted from a multisource scene. However, performance degrades as the number of competing sounds increases, and it is unclear if this 'set size effect' arises from changes in signal-to-noise ratio (SNR) related to the number of competing sources, or from attentional constraints that limit the number of simultaneous sources that can be monitored. In this study, SNR was held roughly constant by fixing the number of competing sources at 8, and the 'relevant set size' was varied by displaying on a visual monitor, prior to an observation interval, a list of 1,2,3,4,6, or 8 environmental sounds, one of which was the target sound (the sound that would be deleted). The ability to localize this target sound decreased as the relevant set size increased, suggesting that the ability to monitor complex auditory scenes is mediated by attentional constraints.