

# This Week's Citation Classic

CC/NUMBER 50  
DECEMBER 12, 1983

**Broadbent D E.** The role of auditory localization in attention and memory span.  
*J. Exp. Psychol.* 47:191-6, 1954.  
[Applied Psychology Research Unit, Medical Research Council, Cambridge, England]

This paper reported a series of experiments on the efficiency with which people could understand one of two speech messages, presented from the same or different locations. A second group of experiments showed a short-lasting memory that could temporarily hold unselected material, and allow later response. [The *Science Citation Index*® (SCI®) and the *Social Sciences Citation Index*® (SSCI®) indicate that this paper has been cited in over 200 publications since 1961.]

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October 31, 1983

"As technology expanded in the 1940s and 1950s, people were increasingly expected to work in artificial environments. That applied particularly to the military, where gunnery systems or air traffic control problems might require the same person to monitor, and sometimes to respond to, numerous speech messages arriving by loud-speaker or headphones. The Royal Navy, and later the Royal Air Force, asked for advice on ways of improving performance. The request ended up at the Medical Research Council's Applied Psychology Unit in Cambridge, England, where I was working as a newly fledged BA. So I spent quite a lot of time looking at ships and control towers, as well as talking to the people who worked in them. Obviously there were problems of speech quality, and of masking of one voice by another.

There seemed also, however, to be difficulties that arose when the man was 'overloaded' with work.

"To research this problem meant getting some of the newfangled tape recorders; more, it would obviously be useful to have one which carried two independent messages on different tracks. We therefore got by special order what must have been almost the first stereo tape recorders in Britain. I then settled down to see how multiple messages could best be presented: mixed, separated into different places, stereo separated, or perhaps one on one earphone and the other on another. Almost all ways of marking two competing messages as localised improved performance, but there was more to it than a reduction in acoustic masking. What we were getting was a selective mechanism, picking some of the input signals for response and discarding others.

"Academic theory of the time did not give much space to such concepts, but tried to work directly with stimulus-response, or at least stimulus-experience links. While this paper had a big practical effect, the main reason for it being cited is probably because it was an early step in the move to theories of internal information processing. Interestingly, it seems to be rarely remembered that the paper itself showed that the selectivity was *not* peripheral, but would work with stereo. Further, it followed an unselective memory system. Much debate on just these points has raged since, and the field of 'attention' is now so extended that it is dividing into separate special groups working in subfields.<sup>1</sup> In the past decade, the emphasis has shifted toward visual rather than auditory performance, because techniques of stimulus control are better. The paper remains relevant as an example of the way in which practical problems can reveal a weak point in academic theorising."

1. Broadbent D E. Task combination and selective intake of information. *Acta Psychol.* 50:253-90, 1982.