

This Week's Citation Classic

Deutsch J A & Deutsch D. Attention: some theoretical considerations.
Psychol Rev. 70:80-90, 1963.
[Stanford University, Stanford, CA]

The selection of messages to which we attend from those to which we do not attend requires discrimination mechanisms of as great a complexity as those in normal perception. This presents a difficulty for Filter theory. Another mechanism is proposed that postulates the existence of a shifting reference standard which takes up the level of the most pertinent arriving signal. [The Social Sciences Citation Index® (SSCI™) indicates that this paper has been cited over 180 times since 1966.]

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"At the time our paper was written, Broadbent had published his important book, *Perception and Communication*.¹ His book marked the real beginning of the modern era of cognitive psychology, a field which has been steadily expanding since. Among other theories proposed in that book, Broadbent put forward Filter theory to account for the phenomena of attention. Because of the assumed limited channel capacity of the central nervous system, some device was postulated that would reduce the information inflow from the senses and so prevent overload. Information was thought to be excluded from the central nervous system by a filter, which would admit only a single message, as defined by some fairly simple features such as a particular frequency range or spatial location. Such a theory endeavored to explain why we cannot listen effectively to two conversations at once, though both conversations are clearly audible, when attention is focused to each separately. The problem for Broadbent's theory, as the experimental work that it stimulated began to show, was that the filter screening the information flowing into the

central nervous system seemed to be using very complex features to select the perceived message. For instance work by Anne Treisman² indicated that the selection process must use sophisticated criteria, such as transition probabilities in speech. It thus became necessary to postulate perceptual and mnemonic capabilities for the filter that were almost identical with those of the central nervous system. This suggested to us that perhaps it was after all the central nervous system that was doing the selecting underlying attention. Our theory therefore sought to explain how the central nervous system could select a perceptual stream after it had sorted and analyzed all the incoming information. The mechanism which we postulated compared the various arriving signals with a shifting reference standard which took up the level of the most pertinent arriving signal. Only the signal reaching the level of this reference standard switched in further processes, such as motor output, memory storage, and other correlates of awareness. In a sense the theory is somewhat paradoxical. Normally one would tend to assume that it is the process of perceptual analysis which coincides with a state of awareness. However in our theory we assume that this stage of awareness is only reached after a decision is made to deal with a percept that is already formed. "The reason why our paper has been so widely cited is probably two-fold. The first is that it gave a clear alternative to Filter theory, and therefore stimulated a great deal of discussion and experimental work. The second is that it was written in a field which was small at the time but which has since expanded enormously. While the distinction between perceptual and attentional processes no longer seems as clear as it once was, many of the problems that were there when the paper was written are still with us and still challenge experimental ingenuity. A recent article in this field appears in the *Handbook of Perception*.³

1. Broadbent D E. *Perception and communication*. London: Pergamon, 1958. 338 p.
2. Treisman A M. Contextual cues in selective listening. *Quart. J. Exp. Psychol.* 12:242-8, 1960.
3. Keele S W & Trammell-Neill W. Mechanisms of attention. (Carterette E C & Friedman M P, eds.) *Handbook of perception: perceptual processing*. New York: Academic Press, 1978. Vol. 9. p. 3-48.