XIX. SIGNAL DETECTION BY HUMAN OBSERVERS*

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RESEARCH OBJECTIVES

About five years ago, it was shown that the behavior of the human observer – in detecting and identifying simple auditory and visual signals – may be described in terms of a theory of signal detectability modeled after statistical-decision theory. A primary concern of this group is to extend the range of the psychophysical application of the theory through further development of the theory, and through experimental study of detection and identification situations that are less restricted than the simple situations investigated previously. Thus we are interested in problems involving sequential observations of a signal, complex signals (including speech), large ensembles of signals, large signal-to-noise ratios, and so forth.

Our second concern stems from the fact that the application of decision theory has identified new independent and dependent variables in psychophysical testing, with the consequence that methods have been refined and conceptions of sensory processes have been revised. For example, the theory specifies the mode of control exerted by an observer over his criterion for signal existence, and it has guided the design of methods of data collection and analysis which permit experimental separation of the effects of variation in the criterion from variation in sensitivity. This result, in addition to illuminating the detection process and providing more reliable indices of detectability, makes possible the unification of data collected under a variety of psychophysical procedures. Given these new tools and conceptions, we are interested in re-examining some of the classical problems in sensory psychology, and in examining other substantive problems in vision and audition that show promise as a result of these developments.

During the past year we have conducted experiments on pitch perception, color perception, signal uncertainty, intensity discrimination, and sequential-observation procedures.

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