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Accuracy, Response Time, Confidence and Short-Term Memory in Simple Decisions

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Most theoretical analyses of psychophysical decision processes have focused on accounting for response probabilities and times and have tended to overlook confidence assessments and to postpone the problem of transitory representation in memory. It is argued that, in addition to their intrinsic interest, confidence assessments present a challenge for theoretical models of psychophysical judgment designed primarily to account for tradeoffs between speed and accuracy. In a similar manner, the need to account for information loss in short-term memory substantially influences the pattern of predictions generated by stochastic decision models. Several hypotheses concerning the basis for confidence assessments and the representation of information in short-term memory are compared and evaluated. Results are presented from a series of experiments involving judgments of the relative frequency of two alternative stimulus elements within rapidly presented sequences. This task allows comparisons to be made between empirical data and theoretical predictions for each individual trial. The results of these comparisons are discussed in terms of competing models of the decision process, combined with alternative hypotheses regarding confidence and the operation of short-term memory. It is concluded that the data are best accounted for by an accumulator decision process, in conjunction with a balance-of-evidence hypothesis concerning confidence and a loose capacity model of short-term memory.