

Psychology 600-303: Proseminar on Human Information Processing
Spring 1998

Descriptions of the Laboratory Exercises

Laboratory A: Iconic Memory. This is a variant of Sperling's (1960) experiment, in which we measure immediate whole report from a brief visual display of letters, and partial report of one cued row at each of several cue delays. Sperling's experiment is elaborated by following the cue on random trials with a pattern mask, to investigate the nature of the representation (its susceptibility to masking) that underlies the response at different delays. Students learn about the high capacity and rapid decay of the visual information store, and become familiar with tachistoscopic techniques.

Laboratory B: Context Effects in Visual Letter Recognition. This lab is based on Johnston's (1978) experiments on the "word-superiority effect" in letter recognition. We follow the display of a string of letters by a pattern mask and compare the accuracy with which letters are identified when the context is a word to when the context is a string of unrelated letters. In the same experiment we compare letter identification in words that provide a highly-constraining context with letter identification in words that don't. These two comparisons permit selection among several interesting theories of letter and word perception. The method familiarizes students with the theory of signal detectability, the distinction between sensitivity and bias, and the analysis of rating scale ROCs (relative-operating characteristics, historically called receiver-operating characteristics).

Laboratory C: Overlapping Tasks and an Information-Processing Bottleneck. Consider two independent tasks: (1) Press one of two keys with your left hand, depending on whether the pitch of a tone is "high" or "low". (2) Press one of two keys with your right hand depending on whether a rectangle is "large" or "small". If the visual display of task 2 is brought close in time to the tone of task 1, the tasks interfere. We vary the time delay between two displays from 50 to 800 msec, and vary other factors as well. The goal is to understand the nature of dual-task interference, as, for example, in Pashler & Johnston (1989).

Laboratory D: Control of Action Sequences. The performance rate and the patterns of times between successive strokes in practiced, rapidly-executed keystroke sequences provide information about the advance planning and hierarchical structure of such sequences. In this lab, students use the computer keyboard to replicate several such effects of sequence length and structure, and consider them in relation to two competing accounts of the fluent execution of action sequences, and the nature and structure of "motor programs" (Rosenbaum et al., 1983; Sternberg et al., 1978).

Evaluation of Laboratory Reports

These are some of the factors that will enter into the evaluation of the laboratory reports:

- (1) Clarity of statement of the purpose(s) of the experiment.
- (2) Accuracy and completeness of the description of salient and important aspects of the data.
- (3) Clarity and explicitness in laying out of theoretical alternatives.
- (4) Use made of references to ideas and findings presented in the readings.
- (5) Soundness of the arguments from the results to conclusions about underlying mechanisms
- (6) Creativity in data analysis, data interpretation, criticisms of the experiment, ideas for additional or improved experiments.

Length and Content of Laboratory Reports

Please be succinct. Reports should contain no more than 5 plots, 3 tables, and 2000 words, and less is better. Plots and tables that are handed out need not be redone; attach copies of excerpts instead, and annotate them if you wish.