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The Effects of Voice and Manual Control Mode on Dual Task Performance

Two fundamental principles of human performance--compatibility and resource competition, are combined with two structural dichotomies in the human information processing system--manual versus voice output, and left versus right cerebral hemisphere--in order to predict the optimum combination of voice and manual control with either hand, for time-sharing performance of a discrete and continuous task.

Eight right handed male subjects performed a discrete first-order tracking task, time-shared with an auditorily presented Sternberg Memory Search Task. Each task could be controlled by voice, or by the left or right hand, in all possible combinations except for a dual voice mode.

When performance was analyzed in terms of a dual-task decrement from single task control conditions, the following variables influenced time-sharing efficiency in diminishing order of magnitude, (1) the modality of control--discrete manual control of tracking was superior to discrete voice control of tracking and the converse was true with the memory search task (2) response competition--performance was degraded when both tasks were responded manually (3) hemispheric competition--performance degraded whenever two tasks were controlled by the left hemisphere (i.e., voice or right handed control). The results confirm the value of predictive models in voice control implementation.