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 inverse control implementation.