

Bridger, R.S. and Long, J. **Some Cognitive Aspects of Interface Design in a Two-Variable Optimization Task. 1984, IJM-MS, Volume 21, p521-539.**

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Abstract

Three experiments on human performance strategy in a two-variable optimization task are presented. Subjects were required to locate a minimum value on a third dimension by repeatedly specifying values on two other dimensions. Two preliminary experiments investigated subjects' informational requirements in performing the task and attempted an initial characterization of strategy. Experiment 1 assessed the effect of a total record of system responses in the form of a list. This was found to aid performance. Prior knowledge of the minimum value, but not its location, was also investigated. This was not found to aid performance. Experiment 2 compared the list with a partial record of system responses known as the current minimum—the most optimal state attained up to any particular point in the task. No significant differences between these two performance aids were found. Experiment 3 compared the total record in list form with a total record in the form of a matrix. Superior performance using the matrix was attributed to the two-variable strategy which accompanied its use, in contrast to the one-variable strategy that occurred with the list.

Although outstanding hypotheses exist and alternative interpretations are possible, some agreement with previous research was found. Suggestions

for the design of optimal user interfaces are given, emphasizing the need to identify critical information for task performance and the relationship between this and the subjects' or operators' strategy.