

# Abstract for the EMPG 1999 Meeting in Mannheim

## **Simulation and Empirical Studies of Forced-Choice Staircases with Fixed Step Sizes**

**Miguel A. Garcia-Perez**

*Departamento de Metodología*

*Universidad Complutense*

*Campus de Somosaguas, 28223 Madrid, Spain*

miguel@psi.ucm.es

Adaptive staircases are widely used in psychophysical research. To obtain a threshold estimate for some given stimulus, the conventional practice is to interweave a number of identical staircases each of which provides an estimate of the target percent point under the psychometric function; all of these individual estimates are then averaged to obtain a final threshold estimate. To reduce experimental cost, each of the interwoven staircases runs for very few trials (or reversals). This work assessed the comparative efficacy of an alternative practice, namely, running a single staircase for an equivalent number of reversals. A simulation study was conducted which showed that the distribution of the average of estimates from three interwoven, 14-reversal staircases has virtually the same mean as that of the single estimate obtained from a 42-reversal staircase, but the latter distribution is somewhat narrower. In addition, the three-staircase procedure always required a substantially larger number of trials than the single-staircase approach. Overall, these simulations (which yielded the same results for the 1-down/1-up (1/1), 2/1, 3/1 and 4/1 rules) indicate that a single, long staircase provides equally unbiased but more consistent estimates than the conventional multi-staircase approach, also incurring fewer trials and, thus, reducing experimental cost. An empirical study using actual human subjects in a detection task yielded results analogous to those obtained in the simulations.