MENTAL ESTIMATION OF TIME

THERE have been several studies[1] both in U.K. and U.S.A. about the accuracy of visual estimation of distance, but no study about the mental estimation of time (unaided by watch or counting), appears to have been made. This note presents a study of mental estimation of time by 15 members of staff of the Defence Science Laboratory, New Delhi.

The subjects were requested to mark five periods of 30, 60, 90 and 120 seconds by giving a signal (starting with a given signal). The true periods correct to the nearest second corresponding to their estimations were recorded by means of a stopwatch and were not known to the subjects. The estimations were made in a quiet air-conditioned room in absence of any clock or watch.

TABLE I

Regression of estimated time on true time for individual subjects

S. No.	r	a	b
1	0·989	12·7	0·700
2	0·978	2·8	1·084
3	0·907	−13·9	0·868
4	0·952	−18·0	1·090
5	0·974	−30·7	1·182
6	0·992	− 1·1	0·840
7	0·998	−102·3	4·310
8	0·982	19·6	0·806
9	0·957	2·0	2·089
10	0·971	6·2	0·769
11	0·972	7·3	0·792
12	0·964	−39·0	1·433
13	0·999	− 1·1	1·441
14	0·991	12·7	0·663
15	0·982	2·0	0·692

The correlation between estimated time E and true time T was uniformly high, above 2 per cent. level of significance for all subjects except No. 3, in whose case also it was above 5 per cent. level of significance.

The slope of the regression line of the estimated time on the true time, however, varied considerably—as also did the individual bias in the estimations. These variable features of individual performance are summarised in Table I. In this table r refers to the coefficient of correlation and a and b are the constants in the following relationship between the estimated time E and true time T.

$$E = a + bT,$$

where E and T are expressed in seconds. It is obvious that for perfect estimation $a = 0$ and $b = 1$.

A noteworthy feature of the data, presented in Table I, is that large departures of a from zero are not accompanied by low values of r, *e.g.*, when $a = -102{\cdot}3$, $r = 0{\cdot}998$. This fact indicates that although estimates by a particular individual may be far from truth, the individual is fairly consistent in his errors for a number of estimates. Thus subject No. 7 has a large negative bias (a) and a slope of 4·31, indicating that the typically overestimated time by a factor of 4·31, less a constant bias of 102·3 seconds.

Table II presents the mean and standard deviation of true periods for the five estimations. These data give the following regression equations :

$$\bar{T} = 0{\cdot}968\,E + 6{\cdot}8$$
$$\sigma_T = 0{\cdot}316\,E + 0{\cdot}6$$

The quantities within brackets in this table are the values of $\bar{T}$ and σ_T as calculated from the regression equations which fit excellently with the data.

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MAHENDRA SINGH SODHA.
A. K. MEHTA.

1. Whitney and Higgins, *A.O.R.G. Report*, 17/48, 1948.

TABLE II

Mean and standard deviation of true periods

E in seconds	..	30	60	90	120	180
$\bar{T}$ in seconds	..	32·9 (35·8)	66·3 (64·9)	94·8 (93·9)	126·3 (123·0)	178·6 (181·0)
σ_T in seconds	..	10·5 (10·1)	21·0 (19·6)	26·3 (29·0)	39·7 (38·5)	56·8 (57·5)

ADSORPTION OF HYDROGEN AND CARBON MONOXIDE ON A COBALT CATALYST—PRESORPTION EXPERIMENTS*

IN the Fischer-Tropsch synthesis, interaction between chemisorbed carbon monoxide and hydrogen on the catalyst is considered to be an essential step towards reaction.[1] A study of such interaction may indicate the nature of the