SHORT COMMUNICATION

A STUDY OF REACTION TIME AND HEART RATE IN MEDICAL STUDENTS

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Summary: Heart rate and reaction time were determined in 74 male and 28 female students before and after viva-voce examination. A statistically significant increase in heart rate and decrease in reaction time was observed in both sexes. The change was more significant in the males than in the females. However, no significant correlation was present between the heart rate and reaction time.

Key words: viva-voce examination heart rate reaction time

Reaction time, the interval between the application of the stimulus and the objective responsee, has been reported to be varying with the time, the subject and the testing site. This can be explained if reaction time is related to the magnitude of the nervous activity reaching the central nervous system in a given time. Muzumdar (5) has shown that on increasing the difference between test temperature and skin temperature, the response curve of the reaction time shows an inverse relation giving the shape of an ellipse within the range of $\pm 8°C$. Biren et al (1) have observed shorter reaction time when the stimuli are presented during the 'P' wave of electro-cardiogram than to stimuli presented during subsequent intervals. This is because of the degree of physiological arousal at the time the subjects were measured. The present work, was, therefore, taken up to find out the degree of physiological arousal in medical students at the time of viva-voce examination by measuring reaction time and heart rate.

MATERIALS AND METHODS

74 males and 28 female students of the Medical College, Nagpur, appearing for the first M.B.B.S. Examination were selected for the study. All of them were free from any physical disability and gave reproducible response. The reaction time and heart rate were determined in each subject one month before the examination and again within 2 minutes after the examination. The subject was given ten trials by the same observer and the mean value was calculated. The procedure for measuring the reaction time required the observer to give a single shock of moderate intensity from an induction coil on the tongue and the subject to react to it as quickly as he could when he felt the sensation, by lifting his finger from the morsekey kept in the same circuit. The moments of stimulation and response were automatically marked on the surface of a moving drum (25 mm/sec) with magnetic time markers. Simultaneously the heart rate was measured by using a sphygmograph.

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RESULTS AND COMMENTS

The mean heart rate before and after the viva-voce examination in the whole group was 84.1±13.7 and 96.9±10.5 per min respectively. (Table I). The mean reaction time before and after viva-voce in the whole group was 212.3±35.4 and 179.7±53.6 msec respectively. The increase in heart rate and shortening of reaction time consequent to a viva-voce examination was statistically significant The heart rate and reaction time of male students were affected more markedly than those of female students.

TABLE I : Summary of observations and tests of significance.

	Before examination mean ± S.D.	*After examination mean ± S.D.*	*'t'*	*'P' at 5% level of significance*
(A) Heart rate/Min.				
(i) Whole group	84.1±13.7	96.9±10.5	7.48	1.980**
(ii) Females	86.6±10.25	96.9±11.09	3.61	2.048*
(iii) Males	83.2±13.6	96.9±11.1	6.65	1.980**
(B) Reaction time (msec)				
(i) Whole group	212.3±35.4	179.7±53.6	5.12	1.980**
(ii) Females	207.85±41.4	179.5±57.9	2.11	2.048*
(iii) Males	214.4±36.9	179.7±52.5	4.65	1.980**

*Significant **Highly significant

The correlation co-efficient between heart rate and reaction time was not significant ($r = 0.109$) which suggests that the mechanisms for heart rate and reaction time changed are not facilitated to the same degree. Fuster (2) stimulated the rostral part of brain system reticular formation in monkeys and observed the increase in thier efficiency for discrimination, and shorter reaction time when the intensity of stimulation was less. However higher intesity of stimulation had a deleterious effect on the performance of the animal. The effect on reaction time by the reticular facilitation is primarily upon "Central integrative time" rather than upon peripheral transmission time. In the present work the reaction time after viva-voce examination was shorter which may be due to the effect of reticular facilitation on the central processing time.

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