EFFECTS OF PHYSICAL EXERCISE ON THE PERFORMANCE OF THE MENTALLY HANDICAPPED

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ABSTRACT

The effects of physical exercise on a three choice reaction time task were examined for a group of adults diagnosed as either mentally retarded or psychiatrically disturbed on admission to an Adelaide Vocational Rehabilitation Centre. Results were compared with a group of non handicapped subjects. The reaction time task, which enabled the separate examination of decision time and movement time, was performed on five occasions; once prior to exercise and then after each three minute period of graded physical exercise on a bicycle ergometer. The exercise loads were determined for each individual according to his or her physical work capacity (PWC).

As in previous research findings, the non handicapped population was found to be significantly faster on both performance measures than the retarded group, and in this investigation also faster than the psychiatric group. This result occurred in both the pre-exercise trial and all four post exercise trials. All groups, with the exception of the non handicapped male sample, showed a significant trend to improve in decision time as the demands of the exercise became heavier. However, exercise produced no change in movement time performance in the groups, with the exception of the psychiatrically disturbed female sample, which showed a small initial improvement. Thus these two parameters of reaction time were affected quite differently by increasing amounts of physical exercise. It was argued that the effect of exercise was seen on central decision making processes, rather than on the peripheral areas concerned with such things as arm speed.

The results were examined in relation to the arousal concept and, in particular, the inverted U hypothesis. The absence of the commonly

found inverted U relationship between level of exercise and performance was explained in terms of the duration and intensity of exercise, and the fact that prior rather than concomitant exercise was used. Examination of the data indicated that the effects of exercise did not dissipate over the four or five minute period of the task even though heart rate, the assumed index of arousal, had returned to normal levels.

A second experiment verified that the improvement in reaction time performance was not due to any training effect as a result of repeated exposure to the task.

Physical work capacity (PWC) for the handicapped groups was compared with that obtained from (a) a mentally retarded group from a Rehabilitation Centre in Scandinavia; (b) adult norms available from other countries and a recent investigation in Adelaide; and (c) the non handicapped group used in the study. PWC for the handicapped groups was significantly lower than that reported for their Scandinavian counterparts and for non handicapped subjects overseas. However, when maximum oxygen intake (MvO_2) per kilogram body weight was estimated from PWC, these comparisons between the handicapped and non handicapped groups revealed differences which were far less marked. It was noted that there was a great amount of variability within the handicapped groups on this measure of cardio respiratory fitness.

Recommendations were made on suggested lines of future research, and on possible schemes of physical activity within Rehabilitation Centres.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and to the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference is made in the text.

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