

THE ANALYSIS ON THE REACTION TIME UNDER THE STIMULUS OF DIFFERENT DIFFICULTY

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INTRODUCTION: This research analyzes comparatively the reaction time of the athletes and the engineering students under the stimulus of different difficulty. It provide scientific support for the training and enhance athlete's ability to react rapidly and accurately.

METHODS: This research selected 54(male and 20 ages) athletes and students as the subjects. The simple reaction time, the selecting reaction time, the whole body reaction time and the reaction time of phrases differentiation under the condition of study or non-study were tested with the made in Japan IS702AV-TACHISTOSCOPE etc. Twenty groups of synonym and antonym were selected randomly from the computer to test the reaction time of phrases differentiation and the computer recorded the testing time and the frequency of the errors. The statistical software StatView J4.02 is used, which used to analysis of variance of regression and discretion.

RESULTS AND DISCUSSION: (1) The results of the athletes' simple reaction time and whole body reaction time are 207 msec and 333 msec respectively, which are much better than engineering students' 228 msec and 396 msec. Therefore, the athletes are distinctively different from engineering students in the aspect of the simple reaction time and whole body reaction time ($p < 0.01$). The athletes' selecting reaction time is not distinctively different from engineering students. The reaction time of phrases differentiation is quite opposite. The result of the athletes' reaction time of phrases is 1171 msec, which is worse than the engineering students' 995 msec. Therefore the athletes are distinctively different from the engineering students in the aspect of the reaction time of phrases differentiation. The above shows that the athletes are obviously advantaged at the ability to react rapidly and accurately under the simple stimulus, but comparatively disadvantage at the ability to react rapidly and accurately under the complex stimulus. (2) The results of the reaction time of phrases differentiation and the frequency of the errors are 1064 msec and 4.09 without study respectively, while the results of the reaction time of phrases differentiation and the frequency of the errors with study are 708 msec and 2.22, which are distinctively different from the former ($p < 0.001$). This shows that the training has made a great impact and should be paid on the adaptive training of techniques reinforcement according to the requirements of the competition and the characteristics of the opponents right before the competition so that the athletes' reaction ability can be enhanced in the competition. (3) The simple reaction time and whole body reaction time's coefficient of correlation is 0.72, and the reaction time of phrases differentiation and the frequency of the errors' coefficient of correlation is 0.54. The correlation is significant. ($p < 0.001$). This shows that the reaction time under the stimulus of different difficulty is not only related to each other but also separated from each other. Under the complex stimulus, the error differentiation is in inverse proportion to the reaction time, which suggests that different training approaches should be adopted to enhance the athletes' different reactionary ability.

CONCLUSION: (1) Compared with the engineering students, the athletes' reaction ability is better under the simple stimulus while worse under the complex stimulus. Therefore the training of the reaction ability under the complex stimulus should be strengthened. (2) The training can make a great impact on the reaction ability under the complex stimulus. Therefore the adaptive training of techniques reinforcement according to the requirements of the competition and the characteristics of the opponents right before the competition can enhance the athletes' reaction ability. (3) The reaction time under the stimulus of different

difficulty is not only related to each other, but also separated from each other and the error differentiation is in inverse proportion to the reaction time. Therefore different training approaches should be adopted to enhance the athletes' right reaction ability under the complex stimulus.

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