Intensity of an auditory “go” signal alters sprint start reaction time

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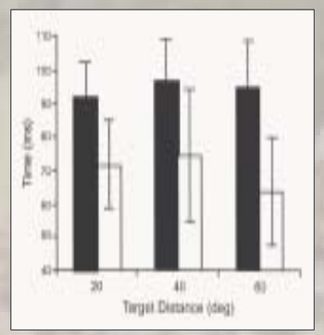
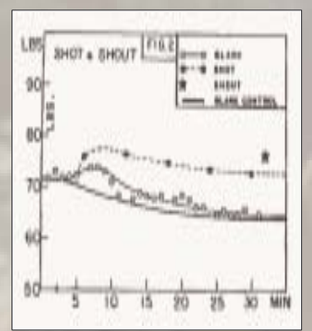
INTRODUCTION

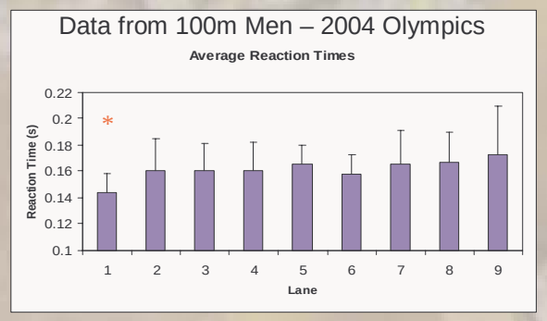
It has been shown in multiple studies that acoustic stimuli of similar intensity to that of a starter’s pistol can evoke a startle response, which also decreases reaction time (Carlsen et al. 2004, Valls-Sole et al. 1995). Also, research on the startle response has shown that as the auditory stimulus increases, the response magnitude (Ikai and Steinhaus 1961) and probability increases, and the response latency decreases (Blumenthal 1996).



Carlsen *et al.* 2004



Ikai and Steinhaus 1961



PURPOSE

The purpose of this experiment was to examine the effect of the intensity of an auditory “go” signal, in the form of a gunshot (audio file), on reaction time in a complex coordination task.

HYPOTHESIS

Reaction time will decrease as a function of increases in auditory stimulus intensity.

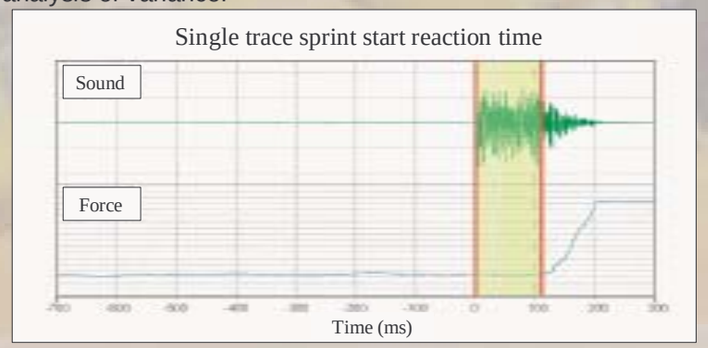
METHOD

Participants:
Five male participants (age 18-42 yrs)

Task:
The task utilized was a sprint start from starting blocks.
Participants performed 2 sets of 33 trials on separate days.

Procedure:
Three go signal stimulus intensities (low – 90 dB, medium – 100 dB, high – 110 dB) were used and their order was randomized (10 trials for each intensity in each set).
Ten percent of the trials were catch trials.
Two verbal commands, “ready” and “set” (audio files ~80 dB), were delivered prior to the onset of the go signal.
The foreperiod between set and go was held constant at 2 seconds since we were specifically interested in the effect of the intensity on the reaction time.

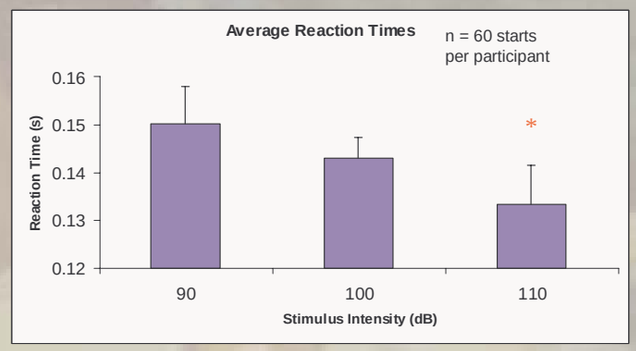
Data Capture and Analysis:
Data were captured using a customized program to record the onset of the go signal and the change in force measured with a force sensitive resistor attached to the back of the starting blocks.
Stimulus intensities were verified with a digital sound level meter.
Group data were analyzed using a one way repeated measures analysis of variance.

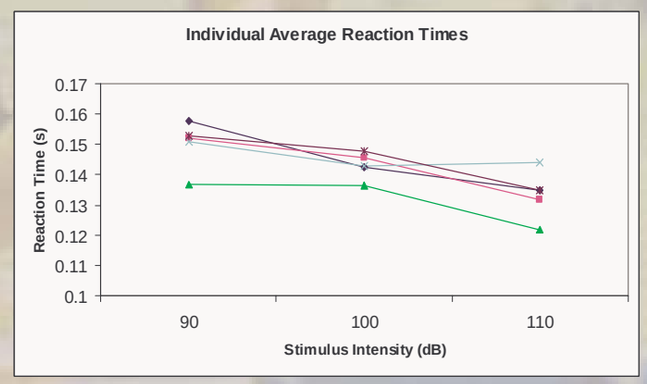


RESULTS

The results indicated a significant main effect ($F(2,8) = 18.62$, $p < .001$). Post hoc analysis (Tukey’s HSD) revealed that the high intensity trials produced significantly shorter reaction times (133±8 ms; mean±SD) compared to the medium (143±4 ms) and high (150±8 ms) intensities, which were not significantly different from each other.

RESULTS





CONCLUSIONS

We suggest from these results that a startle type effect may influence reaction time of a complex coordination task and have implications for standardising sprint start procedures.

ACKNOWLEDGEMENTS

We thank Zoltan Kenwell and Alex Ley for their technical assistance and the Natural Sciences and Engineering Research Council of Canada and the Endowment Fund for the Future at the University of Alberta for funding support.

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