CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J1230

Project Title
EEG Usage to Indicate Mental Imagery and Transition to Physical Activity

Abstract

Objectives/Goals
The purpose of this project was to determine if left-brain and right-brain hemisphere activity could be recorded on an EEG to indicate (left brain) mental imagery/preparation and transition to (right-brain) physical execution of a shot with clay target shooters. My hypothesis was that the EEG would indicate transition from left-brain type imagery to right-brain type physical execution of a shot. This has application as a sports medicine training tool in many types of sports where the athlete may be using a mental preparation tool immediately prior to the execution of whatever it is they may be performing.

Methods/Materials
To start this project, an Olympic shooter was #wired# by a technician with a simple 8 lead setup that would record activity on the left-brain and right-brain hemispheres only. The Olympic clay target shooter was then told to run through a performance enhancing mental imagery program with the EEG started. The shooter would execute shots and then return to the mental program in a sequence of 25 shots. Finally, the EEG data was captured and downloaded onto a notebook computer and later printed onto a left-right brain hemisphere tape showing the two areas only.

Results
When the tape was printed, the transition from left-brain to right-brain was very apparent in most areas. As the shooter began the mental program, there were Beta waves on the left-brain. The second the shooters performed the physical execution of the shot, the Alpha waves on the right-brain abruptly turned into Beta waves and activity on the left-brain stopped or subsided for a brief moment.

Conclusions/Discussion
In the end, my hypothesis was supported and I discovered that an EEG could be used to record a transition from left to right brain hemispheric activity. This would suggest that it may be a diagnostic tool used to help athletes employing a mental imagery program and physical performance. Future studies should employ higher quality EEG instrumentation and athletes of varying disciplines to examine these phenomena.

Summary Statement
The purpose of this project was to determine if left-brain and right-brain hemisphere activity could be recorded on an EEG to indicate (left brain) mental imagery/preparation and transition to (right-brain) physical execution of a shot with

Help Received
Daniel Morse, Ph.D. (and Olympic shooter) and Steve McKinley, M.D. provided materials and study site.