



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

<b>Name(s)</b> Edward A. Trimble	<b>Project Number</b> <b>S0421</b>
<b>Project Title</b> <b>EEG Usage to Indicate Mental Imagery</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> I did this project to see 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 Olympic clay target shooters under physical stress as a diagnostic tool.</p> <p><b>Methods/Materials</b> Two Olympic athletes were #wired# by a technician with a simple 4 lead setup that would record activity on the left-brain and right-brain hemispheres. The shooters were then told to run through a mental imagery program with the EEG started. The shooters would execute shots and then return to the mental program in a sequence of 25 shots. After, the EEG data was captured and downloaded onto a notebook computer and later printed onto a left-right brain hemisphere tape. This would be used as a control for the project. For the test, the shooters were asked to perform 10 minutes of rigorous physical activity. Finally, the EEG process was repeated again for this part.</p> <p><b>Results</b> When the athletes began their routine, with no physical stress, there were theta and delta waves on the left-brain hemisphere indicating a more meditative subconscious routine. The second the shooters performed the physical execution of the shot, the less active gamma waves on the right-brain hemisphere abruptly turned into more active beta waves and activity on the left-brain hemisphere generally continued in a more meditative theta wave mode. In the test where physical stress was included, most of the wave frequencies were the physical beta waves showing that little to none mental imagery was going on resulting in a decline of performance.</p> <p><b>Conclusions/Discussion</b> My hypothesis was not completely supported and the results of my project revealed that physical stress greatly leaves a negative impact on athletes. This puts more emphasis on how an EEG could even be used as a diagnostic tool to unveil how different athletes perform under physical stress and if more mental training is needed in that particular area to increase cognitive choices.</p>	
<b>Summary Statement</b> Project examines 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 Olympic athletes.	
<b>Help Received</b> EEG devise was on loan from a technician who also assisted in the recording. All other work was my own.	