



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> Peter Aoun; Timothy Jones	<b>Project Number</b> <b>S0301</b>
<b>Project Title</b> <b>Spatial-Temporal Reasoning in Mus musculus domesticus Exposed to Mozart</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The term "Mozart Effect" was coined after a study was published indicating that exposure to the music of Mozart had a causal effect on improved brain function. This resulted in worldwide attention and a multi-million dollar industry selling products designed to tap this effect. Despite the public's assumption of the validity of the theory, numerous researchers have explored this issue, but most have been unable to scientifically replicate the original results. After analyzing multiple studies, our experiment was designed to test this theory for ourselves. Our objective was to determine if <i>Mus musculus domesticus</i> (laboratory mice) exposed to Mozart's Sonata for Two Pianos in D-Major perform better in a maze, suggesting improved spatial-temporal learning, than mice exposed to minimalist music or white noise.</p> <p><b>Methods/Materials</b> 18 mice were divided into 1 of 3 listening groups, exposed to either Mozart's "Sonata for Two Pianos in D-Major," Philip Glass' "Music with Changing Parts" (particularly repetitive music), or white noise. The mice were individually tested in a classic T-shape maze over a 5-day examination period, with every mouse performing 3 trials each day (15 trials per subject). The working time and errors were recorded and analyzed.</p> <p><b>Results</b> The mean working time improved across all groups at divergent rates. The Mozart exposure group had a more consistent decrease in working time than the other groups, showing the greatest improvement, and the lowest total mean time overall. In our analysis of the percentage reduction of errors, the mice exposed to white noise improved by 66%. In comparison, the Glass mice showed only a 50% improvement, while the Mozart group made a striking 83% improvement.</p> <p><b>Conclusions/Discussion</b> Our results validate our hypothesis that exposure to Mozart will enhance spatial-temporal performance. It also appears that exposure to other types of music can negatively influence this. Mozart's compositions, in particular, contain an intensity and stimulus complexity that is believed to excite the neuronal firing patterns in the cortical columns of the brain, enhancing spatial-temporal reasoning. If this internal neuronal language can be accurately affected by precise music exposure, the prospective benefits are enormous, both for "average" subjects and those with learning or other cognitive disabilities. The possibilities and the potential for further study are endless.</p>	
<b>Summary Statement</b> Our objective was to determine if <i>Mus musculus domesticus</i> exposed to Mozart perform better in a standard maze, suggesting improved spatial-temporal learning, than mice exposed to minimalist music or white noise.	
<b>Help Received</b> None.	