



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title Mus musculus domesticus Exposed to Mozart, PHASE II: Time-Lapse Effects on Spatial-Temporal Reasoning	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our Phase I results last year demonstrated a significant Mozart Effect in mice. Initial studies indicated that active participation is necessary to attain this. We propose to test whether the effect will be present after a time lapse. The ultimate goal is to pinpoint the longevity of the Mozart Effect and determine if precise exposure to the complexities of Mozart might, due to the neuroplasticity of the brain, lead to long-lasting neurophysiological changes. Also, we want to ascertain whether the Mozart effect is unique to the complex compositions of Mozart.</p> <p>Methods/Materials 40 newly weaned mice were divided into 2 listening groups and exposed to either Mozart or Beethoven for 12 hours per day during their active phase, for a period of 10 weeks. 15 from each group were randomly selected as permanent trial subjects and tested in a classic T-shape maze over a 5-day examination period. Each mouse performed 3 trials per day, totaling 15 per subject, after a 6-hour lapse in music exposure. The working time and errors, indicating spatial-temporal learning, were recorded and analyzed.</p> <p>Results Statistical analyses of subject performance indicate that the difference in their working time and errors is extremely statistically significant, with Mozart mice performing faster and with fewer errors. The Mozart results were compared statistically with the results from our Phase I Mozart mice, and the difference in working time was very statistically significant, indicating that this year's subjects had a shorter working time. Analyzing the errors found no significant differences.</p> <p>Conclusions/Discussion The time-lapse did not negatively affect the performance of the mice, suggesting further studies with longer time-lapses, seeking optimal exposure time. The Mozart mice outperformed the Beethoven mice significantly, however, the Beethoven mice (exposed at a younger age and for a longer period of time) learned at approximately the same rate as our Phase I Mozart mice. This indicates that the Mozart Effect lasts at least several hours, that it is not necessarily limited to Mozart compositions, and that earlier and/or prolonged exposure will result in improved learning. Our hypothesis was correct: spatial-temporal performance improved despite the time-lapse between auditory stimulation and performance. The <i>Mus musculus domesticus</i> exposed to Mozart exhibited greater learning than those exposed to Beethoven.</p>	
Summary Statement Our Phase II study tests the effects of a time lapse on the spatial-temporal abilities of <i>Mus musculus domesticus</i> (laboratory mice) exposed to Mozart or Beethoven, represented by their performance in a standard maze.	
Help Received None.	