



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Warren J. Laufer	Project Number J0321
Project Title Which Improves Cognitive Function More, Gum Chewing or Exercise?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This experiment tests whether gum chewing and exercise improve performance on a simple math test, and if they do, which improves performance more?</p> <p>Methods/Materials Methods: Read instructions; administer first math test; read instructions for next test; pass out gum; students read for five minutes while chewing gum; administer second test; students throw out gum; students go to P.E., run a lap, and do ten jumping jacks; return to class; administer third test; collect tests. Materials: 1) Test packets with cover page, three tests of 24 addition and subtraction problems, two #stop# sheets. There are #A,# #B,# and #C# versions of tests, which rotate order in each packet. 2) Instructions. 3) Sugar Free Gum 4) Stop Watch 5) 28 sixth grade GATE students.</p> <p>Results Subjects completed 46% of the problems correctly in the control, and 50% correctly in the gum chewing trial. After exercising, they completed 52% correctly. With each successive trial, the number of problems completed and the number completed correctly increased. The percentage of problems completed correctly from the number attempted remained at 96%.</p> <p>Conclusions/Discussion A simple math test was given to sixth graders in three different trials. The first trial was a control to find base scores. Manipulated variables were the tasks performed during the second trial, gum chewing, or the before the third trial, exercise. The responding variables were the number of math problems that were attempted and the number completed correctly. This study suggests that chewing gum and exercise both improve test performance. In the second and third trials, the subjects showed improvement over the control trial in both the number of problems tried and the number of problems completed correctly. In the third trial, subjects attempted and completed correctly more problems than they did in the second trial. This suggests that exercise improved performance on the tests more than chewing gum, indicating that the improved oxygenation of blood, which comes from increased heart rate, is the reason that gum chewing improves cognitive performance. However, because test performance improved with each trial, it is possible that the results were caused by a practice effect. Still, addition and subtraction are not new skills for sixth grade GATE students, and practice may have no effect on performance any more than spelling a familiar word increases spelling ability. Further research is needed.</p>	
Summary Statement In this project, I investigated what causes the "gum chewing effect" by comparing cognitive function after chewing gum and after exercise.	
Help Received I'd like to thank my teachers, Mrs. Rolfe and Mrs. Schmidt, for letting me test my class. I'd also like to thank my class for letting me test them. I'd like to thank my sister, Allison, for helping me with my graphs, and my mom for getting the test packets copied for me, and for helping me with the typing.	