# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
David C. Andrecht

**Project Number**
**J0601**

**Project Title**
## Improve Memory with Music

**Abstract**

**Objectives/Goals**
My objective was to determine if music can actually improve short-term memory. My hypothesis is that music in the background of testing will help improve short-term memory. I chose Mozart's Piano Concert No. 20 in D minor.

**Methods/Materials**
I was able to test 35 subjects in a series of tests. The testing was made up of six groups of letters shown in 5 second intervals. The groups were increased by two letters each time, letters were selected randomly for each test. I started with 2 letters and increased to 12 letters by the end of the testing. The subject wrote down the letters they remembered after each group of letters was shown. The first series of tests was given with no music in the background. The second series was given with music in the background. Each subject had to complete 2 seperate tests for a total of 70 tests completed.

**Results**
I did observe that during the music portion of my testing my subjects were even more observant of the task at hand. My data shows a decrease in memorization of letters as the amount of letters tested increased. Although, with music 14.5% more letters were remembered in test number 5 (10 letters tested) than test number 4 (8 letters tested). Overall 25.5% more letters were remembered with music playing than without music playing. Indicating that music actually did in fact improve short-term memory.

**Conclusions/Discussion**
In conclusion, my test results indicate that short-term memory is improved with the aid of music, as stated in my hypothesis. This information could also be used in our personnel lives as well. I have learned by doing this project that this type of music seems to have a calming effect on a persons senses. I have even played it while studying for a test, and it seems to improve my concentration of the task at hand.

**Summary Statement**
The ability to improve your short-term memory with music by Mozart.

**Help Received**
My Mom helped proofread report; My Dad helped fix the printer; Testing of St. Mary's students.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Sierra Ankley; Sarah Sugar

**Project Number**
J0602

**Project Title**
# How Does the Mode of Taking In Information Affect a Student's Recall of Information?

**Abstract**

**Objectives/Goals**
We tried to find out how the mode of taking in information, hearing a story or reading one, affects the student's recollection of the information. We believe that overall, although many people will differ in results, most will have higher scores in the visual because they can read at their won pace and re-read parts if they drift or are not paying enough attention.

**Methods/Materials**
Our subjects consisted of 8th grade students. We divided them into two groups, Group A and Group B, and tested them over the course of four days. On day one, Group A read a story and Group B had the same story read to them. Then they took a 10 question test on the information 20 minutes later. On day two, three and four, they switched off, each reading and having the story read to them twice.

**Results**
On day one, the six students in group one had the story read to them and had an average of four of ten factual recall questions correct. The ten students of group two read the story themselves, and had an average of 5.5 correct. On day two, group one read the story and had an average of six correct. Group two now had the story read to them, and scored an average of five correct. Day three group one had the story read to them again and group two read the story themselves, both scoring an average of 7.5. Day four, group one read the story, averaging 5.2. Day four group two heard the story and averaged about 5.5 correct. The average of the students in both groups who read the story themselves scored six of ten factual recall questions correct. The average of the students in both groups who heard the story scored 5.46 of ten factual recall questions correct. The conclusion to our experiment is reading a story or hearing it oneself did not have much effect on the students# recollection of the information.

**Conclusions/Discussion**
Our experiment seems to show that reading something or having someone read it to someone does not have a large effect on how well information is retained. This is important because if there was a large impact with most students it could affect how teachers teach or how most people try to learn new information. Teachers may find this experiment helpful because it could affect the way they teach. If there were a large difference within the subjects' scores, teachers may change the way they teach in order to help their students retain more information.

**Summary Statement**
We were testing to see if students retained information better from reading a story or hearing it.

**Help Received**
No help

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Madeline K. Atchison

**Project Number**
**J0603**

**Project Title**
## Imagine to Learn

**Abstract**

**Objectives/Goals**
The objective is to determine which presentation is better for learning and retention: textual or graphical?

**Methods/Materials**
Take one group and give them five minutes to memorize twenty-five random words. Then come back a week later and test the same group but with a different twenty-five words, by telling them a vivid story which incorporates the five senses and has them create an image in their minds. Repeat this step with five other groups.

**Results**
The results were that Graphical learning showed a ninty-four percent improvement. Clearly outperforming textual learning.

**Conclusions/Discussion**
In conclusion, graphical learning did exceptionally well,outpreforming texual learning. So, if you ever need to learn and retain information quickly and accuratly, use the graphical learning method.

**Summary Statement**
The project is about learning and which method, textual or graphical, is better to use.

**Help Received**
The people who helped me the most were the junior high students who took a series of tests for my project.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Joshua S. Bertey

**Project Number**
**J0604**

**Project Title**
## Does Font Size Affect Fluency?

**Abstract**

**Objectives/Goals**
Reading fluency is the ability to read phrases and sentences smoothly and quickly. Young readers need to develop their fluency so they can become better readers. Fluency also helps readers with their comprehension. Studies have stated that some students preferred reading a book with large print. Large print is defined as a 14 point or larger font.

**Methods/Materials**
1) Reading fluency tests were collected from second, third and fourth grade teachers.
2) For each grade level tested, fluency tests were typed using both 12 and 16 point font sizes.
3) Twenty copies of each test were made.
4) Teacher permission was received to test average readers from their respective classes.
5) For each student, the 12 point font size fluency test was administered first followed by the 16 point font size test.
6) Students were instructed to read as much as they could for one minute. Students were also permitted to use their finger to track their reading.
7) Word counts and mistakes were tracked for each student and a word per minute total was calculated.

**Results**
The results for the second grade readers showed they read more words per minute on the 16 point font size test. Each of the 20 students improved on the larger font size test. The hypothesis was correct for this grade level. The results for the third grade readers showed that 12 out of the 20 readers actually did better on the 12 point font fluency test. The results for the fourth grade readers showed that 15 out of the 20 readers did better on the 12 point font fluency test. Therefore, the hypothesis was not correct for the third and fourth grade readers.

**Conclusions/Discussion**
Research has found that larger typed words similar to those found in picture books for younger children is preferred by children in the late primary grades and by some intermediate grade children. Studies have also stated that with larger print it means there are fewer words on a page making it easier for readers to decode. Progress is noted with comprehension, tracking and fluency and also make fewer mistakes are made. Research also shows that larger font sizes force the eye to move slower than with standard-sized fonts. Students are able to track their reading easier with the larger fonts. Testing struggling readers rather than average readers in the fourth, fifth, and sixth grades would be a consideration for future experimentation.

**Summary Statement**
The project is to find if there is a direct correlation bewteen print font size and reading fluency in grade school students.

**Help Received**
Mom typed the fluency tests.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Supriya A. Bhupathy

**Project Number**
**J0605**

**Project Title**
## Left Brain, Right Brain: Does Handedness Affect Memory?

**Abstract**

**Objectives/Goals**
The purpose of this study is to determine whether or not there is a difference in the short-term memory of left-handed and right-handed girls in grades five through nine in order to learn more about brain function. The hypothesis states that the collected data will reveal that there is no significant difference between these two groups.

**Methods/Materials**
The materials used were eighteen 4 x 7 note cards (six flashcards with nine numbers on each, six with nine letters on each, and six with nine words on each), Test Subject Answer Sheet, Score Sheet, and a stopwatch.The test subjects were given 10 seconds to memorize data on each flashcard, one by one, and another ten seconds to write down the data they recalled. The answer sheet was graded and the data was recorded. The manipulated variable was handedness, the controlled variables were that all the subjects were girls and in grades 5-9, and the responding variable was the score on the test. A total of twenty-two sets of data were collected and used for the analysis, eleven for each group.

**Results**
The total scores (out of 162) on all 18 note cards for the eleven left-handed subjects were as follows: 97, 130, 93, 103, 112, 97, 109, 88, 72, 99, and 105. The total scores on the same test for the eleven right-handed subjects were as follows: 114, 110, 119, 109, 114, 116, 105, 119, 104, 132, and 109. The mean for the left-handed test subjects was approximately 100.45 +/- 29.34 with a variance of 215.27. The mean for the right-handed test subjects was approximately 113.73 +/- 15.8 with a variance of 62.42. The unpaired t-test showed that there was a significant difference between the two means with a 95% confidence interval, which means that the right-handers did significantly better on the memory tests.

**Conclusions/Discussion**
Statistical analysis of the means showed a significant difference in the memory of left-handed and right-handed girls in grades five through nine, with memory being better in right-handers. However, the results are inconclusive because normal distribution could not be shown with the small number of subjects and there was a large variance. This made the t-test less reliable. There were also individual factors (such as grade and motivation) and environmental factors (such as location of testing) to consider. For these reasons, the hypothesis can neither be proven nor disproved at this time.

**Summary Statement**
By doing this project, I attempted to determine if there is a significant difference in the short-term memory of left-handed and right-handed girls.

**Help Received**
Science teacher, Mr. Cornell, hepled in statistical analysis; parents helped in recruiting test subjects; mother proofread report.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Allison W. Cheung

**Project Number**
**J0606**

**Project Title**
## Smell Your Way to Good Memory Power

**Abstract**

**Objectives/Goals**
My experiment's purpose is to see how smells can affect a person's short-term memory. Going into further depth, I will investigate which of the following smells (Vanilla, Rosemary, Peppermint, Eucalyptus, or Lemon) improves short-term memory the most.

**Methods/Materials**
Paper and pencil for the memory quiz;
Vanilla scented oils;
Rosemary scented oils;
Peppermint scented oils;
Eucalyptus scented oils;
Lemon;
2 groups of 6 people each.

1) Form 6 memory quizzes with 6 trials each.
2) For the control group, give each person in your group the memory quiz.
3) The next day, have each volunteer take five deep breaths of a scent. Then have his or her take the new quiz with the scent.
4) Do the same for each scent.
5) Compare results.

**Results**
After performing my experiments, I found out that smells actually do affect memory, but in different ways. Rosemary improved memory the most. Eucalyptus made the volunteer perform even worse than without smells. However, I noticed that each of the volunteers did badly while smelling their favorite smell. Nobody liked rosemary, therefore, they did the best on that smell.

**Conclusions/Discussion**
The results of my experiment will prove if smells benefit short-term memory or not. If smells do benefit short-term memory, students can smell scents while studying to maximize study time efficiency. Those who have troubles with remembering can use scents to aid them. Rosemary will be beneficial to people like these. They can use this scent to boost their short-term memory ability.

**Summary Statement**
My project tests to see if smells can affect a person's short-term memory.

**Help Received**

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Mattie Christofferson

**Project Number**
**J0607**

**Project Title**
## The Creation of a Person

**Abstract**

**Objectives/Goals**
My objective was to learn at what age a child could began drawing a person with all major body parts, such as head, body, arms, legs, hands, feet, neck, eyes, nose and mouth and drawn in the correct place.

**Methods/Materials**
Before starting my experiment I had to contact a Pre-School and an Elementary School. I needed sixty four year olds, one hundred five year olds and one hundred six year olds to do my experiment. I spoke with the Director at the Pre-School and the Principal at the Elementary School to get their approval to come to their schools to do my experiment. I talked a letter to each teacher; explaining what my experiment was about and I had them approve, that it was okay for me to come in to their classrooms. I also wrote a letter to each parent explaining who I was and that I had their child draw a person to help me with my experiment. When I arrived in the classrooms I got the children#s attention and introduced myself. I explained to the class that they were going to do an art project. I handed out a blank piece of white paper and a pencil and ask the children to draw a person. They were asked to raise their hand as soon as they were done. When I picked up each drawing I would ask the children how old they were and I wrote it in the right hand corner of the paper. I went home and reviewed each drawing and the age of the child. Then I placed the results on to a data table.

**Results**
In my hypothesis I stated that children at the age of four could draw a recognizable person, but my study show that a higher percentage of children at the age of six can draw a recognizable person. Children at the age of four can draw a person, but the arms are attached to the head, some children drew a person that looked like a sun and other children only drew legs attached to the head.It was interesting to note that if a child drew fingers on their person at age four they only drew two or three, but at age six most the children drew five fingers.

**Conclusions/Discussion**
My conclusion does not support my hypothesis. The reason I assumed that children could draw a recognizable person at age four was because I could and I wanted to see if that was true with other children.

**Summary Statement**
At what age will a child be able to draw a recognizable person.

**Help Received**
During this project, I have received help from my mother, Melinda Christofferson. She was not only my mentor, but she also drove me from place to place to get where I needed to go for this project.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Tanner Owen Clark

**Project Number**
**J0608**

**Project Title**
## The Lego Learning Link

**Abstract**

**Objectives/Goals**
The question was asked: Do underperforming seventh graders perform better in reading comprehension if they know they will be creating with Legos after reading the selection? The objective was to find out if underperforming seventh graders did better on a reading comprehension quiz if, before reading the selection, they knew they would have to create something from the selection using Legos.

**Methods/Materials**
Materials: Legos, McCall-Crabbs Test Lessons in Reading.
Methods: Students in a strategic (underperforming) seventh grade language arts class were divided into small groups. Each day, all groups were given two levels of reading selections and comprehension quizzes. A different group each day was chosen to create with Legos. The group was told before reading the selections that it had been chosen to create with Legos that day, and that they were to create something from one of the reading selections. The experiment was repeated for three days, with a different group creating with Legos each day.

**Results**
Underperforming seventh graders do perform better in reading comprehension when they know they are creating with Legos afterward.

**Conclusions/Discussion**
The implication of this study is that schools should be creating opportunities for creative expression and hands-on learning if test scores are to rise. As this is NOT what is currently happening, I recommend further investigation on this matter.

**Summary Statement**
This project is about the link between comprehension and creativity.

**Help Received**
My mom helped type the report and helped troubleshoot when using Excel spreadsheet to make graphs.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Elaine Cunha; Mei Lan Hughes

**Project Number**
**J0609**

**Project Title**
## Dropped Connections: How Cell Phone Use Affects Performance

**Abstract**

**Objectives/Goals**
The object of our science project was to determine if attempting two things at once, in this case, taking a simple reading comprehension test while answering multiplication problems over a cell phone, is less efficient and accurate than doing one task at a time.

**Methods/Materials**
We used two reading comprehension tests and two cell phones. Our test subjects were sixteen seventh and eighth grade students at Sunny Brae Middle School (eight boys and eight girls). Every individual had two minutes to complete each of the two tests. Both tests had a one paragraph passage and four questions. The first reading comprehension test was taken without the cell phone and multiplication problem distraction, and the second one with. Each student was tested separately in an empty classroom.

**Results**
By using the three measures of central tendency (mean, median, and mode), multitasking with cell phones appears to be not only less accurate but also less efficient. As for gender differences, the boys scored higher on both reading comprehension tests (with and without distraction). The girls, however, achieved a higher score than the boys on the multiplication problems. This is partly due to an outlier in our data.

**Conclusions/Discussion**
In conclusion, our results indicate that multitasking cuts efficiency and accuracy by a significant amount.

**Summary Statement**
The affect of cell phone use on pre-learned knowledge.

**Help Received**
Mrs. Jones let us use her classroom and my mom and dad helped read over and edit the different parts of our backboard.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Saira Delgado

**Project Number**
**J0610**

**Project Title**
# Comparing International Math Test Results Using an American Standardized Test

**Abstract**

**Objectives/Goals**
The objective of my project was to learn if Japanese students could outperform American students in an American mathematics standardized test, and if so, why.

**Methods/Materials**
Print out California Standardized Test Grade 7 Mathematics. Select 10 questions of different standards from California Standardized Test Grade 7 Mathematics Released Questions. Translate selected questions of test to Japanese. Make 70 copies of test. Obtain 70 Japanese eighth grade students from a Japanese public school. Test students in class after three months of school in session from the beginning of the year. Time ten (10) minutes for students to complete test. When all students have completed the test, collect tests. Score all tests. Repeat the testing process for 56 American public school students. Input scores into computer, and compare Japanese and American results.

**Results**
The American females scored on average 0.1125 points higher than the Japanese females. The Japanese females had an average 6.2 points out of a possible 10. The American females scored 6.3125 points. The Japanese males scored on average 6.54 points out of 10 possible. The American males scored on average 1.165 points lower and scored an overall average of 5.375 points. In general, with the averages of male and female students, the Japanese scored higher by about 0.53 points out of 10.

**Conclusions/Discussion**
The Japanese students scored higher than the American students overall. A surprising point of my results was that the American females scored higher than the Japanese females did. However, the Japanese males scored higher than the American males did. I think that the American students should strive to outperform the Japanese students in worldwide math tests. If the American students perform better in school, it can influence the rest of their education, their career, and the rest of their life.

**Summary Statement**
My project's main focus is if Japanese students, similar to international test results, can outperform American students on an American standardized test and if so, why.

**Help Received**
Mr. Yuichi Shibuya, principal of Iko Middle School, Tokyo, Japan, supervisor of Japanese student testing; Mr. Jeff Shahbazian, middle school math teacher of Sanger Academy Charter School, Sanger, CA, supervisor of American student testing

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Morgan M. Dressel

**Project Number**
**J0611**

**Project Title**
## The Internal Scream

**Abstract**

**Objectives/Goals**
My project was to see the effect of a teachers verbal statement, prior to beginning a test, on pre-teen students.

**Methods/Materials**
Students, specific math test.

7Th grade students were given the exact same math test one week apart. The math teacher handed out each test but what was said before the students began the test was changed. The first time the teacher tried to say a neutral statement to the students so that they were not anxious. The second time the statement was different and was supposed to make the students more anxious.

**Results**
The researcher for this experiment actually was able to witness the experiment herself. On the first test, when the teacher did not thoroughly stress the importance of the test, the students sat comfortably in their seats and took the test with ease. On the second test though, when the teacher highly stressed the importance of the test, the students were uncomfortable in their seats, they asked many question to reassure themselves that they new the topic, and they were extremely jittery. The hypothesis was that the students would have lower scores on the second test because their anxiety level would be very high and that this high anxiety would have a negative impact. Through what the researcher saw taking place in the class, the nervousness and agitation of the students, she was almost sure her hypothesis would be correct. But, when the tests were scored, it was clear that the anxiety level was helpful to the students, for when the students knew who the tests were going to and the importance of the test, they immediately tried their absolute hardest and performed better.

**Conclusions/Discussion**
My conclusion is that without a certain level of anxiety, it is very difficult to perform well on any test.

**Summary Statement**
My project is about the effect of a verbal statement by a teacher on the anxiety level of a student.

**Help Received**
Fellow students took a math test.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Joanna N. Eskander

**Project Number**
**J0612**

**Project Title**
## Kindergarten Starting Age

**Abstract**

**Objectives/Goals**
This project is created to see whether the starting age for kindergarten affects the student later in education.

**Methods/Materials**
A test is created based on the California State Standards for the core subjects from 6th to 8th grade. Both genders are tested based on their starting age for kindergarten. There is a field of 20 test subjects, ideally half male and half female, in the 8th grade with a variety of starting ages. Preferably five of each starting age; plus 5 more students for the control group.

**Results**
I found that the students who entered kindergarten at the age of 6 had the highest averaged score, whereas the students entering at 4 had the lowest.

**Conclusions/Discussion**
When students are older in an environment of younger peers they store more information than the others. This idea continues throughout middle school learning.

**Summary Statement**
This project's goal was to see whether the age students start their kindergarten year affects them later in middle school education.

**Help Received**
My teacher, Ms. Sumner, for keeping me focused on my project.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Mary Alyssa Flemming

**Project Number**
**J0613**

**Project Title**
## How Does Your Brain Work? Stroop Effect vs. Warped Words

**Abstract**

**Objectives/Goals**
My objective is to see if an average person, from each age group, brain is effected by either Stroop Effect or Warped Words.

**Methods/Materials**
The project was done using a random pick in 5 age groups, with 10 different people in each. The human subject was tested on each the Stroop Effect and Warped Words test, by naming the color of the word. Example: The word "Red" printed in green ink; the human subject would say "green". The results were raked by the age group with the fastest time and the amount mistakes.

**Results**
Teenagers placed first, while the seniors placed last in fastest time in both stroop effect and warped words. Young adults placed first, while seniors and 9-12 aged tied for last place for average number of mistakes in both stroop effect and warped words.

**Conclusions/Discussion**
During my project, I learned just because an age group gets first in least amount of mistakes doesn't mean that that same age group will get first in fastest time as well. While doing my graphs and discussion of results I discovered that the youngest and oldest age groups are the slowest with many errors, while teenager to middle aged adult minds work sharper.

**Summary Statement**
My project is comparing how 5 different age groups perform on the Stroop Effect and Warped Words test.

**Help Received**
Mom helped type and put board together; Both parents helped get people to test; Nikki Luckin was my inspiration to keep going and my proofreader.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Leah Johnson; Camilla Richardson

**Project Number**
**J0614**

**Project Title**
## What Conflicting Mental Tasks Reveal about Thinking: The Stroop Effect

**Abstract**

**Objectives/Goals**
The objective is to determine if your brain will delay to read the correct word if the colored word is different than the ink color.

**Methods/Materials**
We tested 24 people by having them read 4 separate lines. The first line contained lower case words in regular color format (ex. the word blue in blue ink). The second line contained lower case words in a different color format (ex. the word blue in red ink). The third and fouth lines were the same as the first and second except in capitalized letters. We recorded the times it took to read each line. Material used were computer, timer, typed colored test paper, paper to cover the words that were not being read, pencil, list of people tested and two hard-working girls (us!!!).

**Results**
The times were recorded in seconds and milliseconds. Our graphs showed that most people took longer to read the different colored words.

**Conclusions/Discussion**
The lower case in regular color format is easier to read than the different color format. Capital letters are easier to read than lower case letters. Our conclusion overall is that regular color formats are easier to read regardless of upper or lower case words.

**Summary Statement**
Our project is about the Stroop Effect and how it changes the way your brain reads the colored words.

**Help Received**
Leah's Mom helped with board layout and grammar.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Jonah S. Kaye

**Project Number**
**J0615**

**Project Title**
## Try to Remember: Do Left-Handed or Right-Handed People Have Better Short-Term Memory?

**Abstract**

**Objectives/Goals**
I am left-handed, and I have always been interested in the differences between right- and left-handed people. Since left- and right-handed people use different sides of the brain more dominantly, I wondered whether short-term memory was affected by dominant handedness. My hypothesis was that right-handed people would have more extensive short-term memory than left-handed people. I reached this conclusion because the left side of the brain, the dominant side of right-handed people, is responsible for activities suitable for memorizing, such as language and patterns. The right side of the brain, the dominant side of left-handed people, is responsible for activities not necessarily associated with memory, such as creativity and philosophy.

**Methods/Materials**
I recruited 7 right- and 7 left-handed subjects, ages 11 - 14. I constructed 3 lists of computer-generated random numbers from 1 to 12 digits, and put the numbers on index cards. Using a stopwatch, I gave each subject 10 seconds to look at a specific card, then the card was covered, and the subject was given the next 10 seconds to record that number on an answer sheet. The cards were shown to the subject in sequential order, and this procedure was repeated for two more trials. Each individual trial was given a score that corresponded to the last set of digits the subject had answered correctly. The final score for each subject was the average of all 3 trials. I then averaged the results of all the right- and left-handed subjects.

**Results**
The overall results showed that right-handed subjects scored higher than left-handed subjects. In fact, right-handed subjects, on average, could memorize almost one more entire line of digits than left-handed subjects.

**Conclusions/Discussion**
The overall data proved my hypothesis that right-handed subjects have better short-term memory than left-handed subjects. For reliable results, I limited the age range of subjects and used the same number of left- and right-handed participants. Of course, a larger sample size would make the data more accurate. In addition, to minimize potential errors, I recruited subjects from similar educational backgrounds, used a stopwatch for timing, flipped the index cards consistently, and conducted the experiment each time in the same quiet environment. In any case, it seems that right-handed people have an advantage over left-handed people when it comes to short-term memory.

**Summary Statement**
Do left-handed or right-handed people have better short-term memory?

**Help Received**
My mother and father helped type and proofread the written parts of my exhibit.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Rachelle F. Melvin

**Project Number**
**J0616**

**Project Title**
## Memory and Learning

**Abstract**

**Objectives/Goals**
My objective is to find out if visual, auditory, tactile, or a combination of these modes will best help students learn and remember. I think that the best results will be from using as many modes as possible.

**Methods/Materials**
I used a computer and LCD projector to test the memory of 113 third graders. I made five slide shows of seven pictures each with an interval of four seconds between each picture. I tested the students by showing the first set of seven pictures. At the end of the slide show, the students wrote down as many pictures as they could remember. On Test 2 I read seven words and the students wrote down as many as they could remember. I gave three more tests in the same way. On Test 3 I showed pictures and said the word aloud. Test 4 had pictures and I said the word aloud with the students repeating the word. On the last test I showed the pictures, said the word for the picture aloud while clapping out the syllables, and had the students copy me. After I gave all the tests I calculated the results.

**Results**
Tests 1 and 3 had the highest scores. On Test 3 (Visual and Auditory) the students scored an average correct of 5.16 out of 7. On Test 1 (Visual) the average correct was 5.07. Test 4 (Visual, Auditory, and Recite) was 4.89, Test 5 (Visual, Auditory, Recite, and Tactile) was 4.19, and Test 2 (Auditory) was 3.78.

**Conclusions/Discussion**
I concluded that the best way to memorize something is to see and hear the information. This is a combination of the visual and auditory modes.

**Summary Statement**
My project is about determining the best way to memorize information.

**Help Received**
My mom helped me understand my research, supplied the students and materials, consulted with me on my results, and helped me glue the steps on my display board.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
M. Carolina Moser

**Project Number**
**J0617**

**Project Title**
## The Stroop Effect: The Bilingual Factor

**Abstract**

**Objectives/Goals**
The scientist conducted the experiment to determine if bilinguals would have a faster time vs. monolinguals when taking the Stroop Effect test. The scientist believed that if a bilingual person would take the test, they would have a faster time due to knowing a second language.

**Methods/Materials**
The scientist tested 37 bilingual and 37 monolingual adults between the ages of 60-70 years old. Each participant was tested and timed twice on the Stroop Effect. Each participant was tested with a congruent Stroop Effect test, then with an incongruent test. The scientist then gathered the results of everyone and calculated the average per group (bilingual and monolingual). By comparing the results, the scientist concluded which group was faster.

**Results**
After analyzing the data, the scientist concluded that the monolingual participant#s average time was faster than the bilingual participant#s average time. To determine this, the scientist compared the two averages of the congruent and incongruent averages of both bilingual and monolingual. The results gathered from the data showed only one second difference between the two groups. The results proved that the scientist#s hypothesis was wrong, because it showed that monolinguals had a faster time in achieving the task.

**Conclusions/Discussion**
The main goal of the experiment was to determine whether bilingual people would outperform monolinguals when taking the Stroop Effect Test. After analyzing the data, the scientist concluded that the monolingual participants# average was faster than bilinguals# average. Still, the scientist was proven wrong in the original hypothesis which stated that bilinguals would have a faster time on achieving the task over monolinguals. This was quite a surprise to the scientist. Further testing could also be done without peers present and with different age groups and compared to the scientist#s group. In conclusion the Strop Effect is very intriguing aspect of psychology. The scientist learned that small issues such as having the participant tested in front of peers can have an effect on the results. Even though the results were not as expected, the Stroop Effect is still a great way to learn about the brain.

**Summary Statement**
The Stroop Effect and the bilingual factor have caught the eye of many scientists and the attention of many psychologists because it helps understand how your brain works when you have interference.

**Help Received**
My Mother helped me create the graphs that I needed for my project and suggested areas of improvement in my report. She also helped me cut and glue some of the papers for the board. My Father as well as Mrs. Swann and Mrs. Christy read over my report and helped me with spelling and grammar errors.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Kelsey N. Patch

**Project Number**
**J0618**

**Project Title**
## Remember to Chew: Chew to Remember

**Abstract**

**Objectives/Goals**
The purpose of this experiment was to test if chewing gum helps improve memory.

**Methods/Materials**
To test this, approximately 70 to 80 middle-school students (6th, 7th, or 8th grade) students from the same private school were asked to read select information on a subject for two minutes and then take a test of their recollection of the material studied. Each Participant took two tests of similar difficulty (same amount of time, similar length of reading material, comparable subject matter, and same number of test questions). During one test, the Participants were asked to chew gum while studying and taking the test. On the other test, Participants did not chew gum while studying and taking the test. The order in which the tests were administered (with or without gum) was alternated, so that approximately half of the participants start with gum and the other half without gum. This was done to eliminate any bias related to improvement from taking similar tests back to back and also mitigate any difference in the results that can be attributed to differences in difficulty between test #1 and test #2.

**Results**
Based upon the data collected in the experiment, chewing gum while reading and answering questions related to the reading material appears to increase the Participants' recollection of information. The average Participant increased their Memory Test score by 8.87% (mean increase), while the median and mode of the Memory Test scores also increased by 9.09%.

**Conclusions/Discussion**
Chewing gum while studying improves memory by an average of 8.87%, which support the hypothesis that chewing gum improves memory and acts as a cognitive enhancer. We all know that it is important to "remember to chew" but this experiment shows that we might also want to "chew to remember."

**Summary Statement**
This project tests whether chewing gum while reading helps improve the recollection of information (memory).

**Help Received**
Four middle school students assisted in administering the tests to the participants, including distributing test packets, timing of the reading and question answering sections, and collecting completed tests.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Bellana E.A. Roemer

**Project Number**
**J0619**

**Project Title**
## Big Font Small Font

**Abstract**

**Objectives/Goals**
My project was to determine how font size affected reading comprehension by fifth, sixth, seventh, and eighth grade readers.

**Methods/Materials**
1. Use Times New Roman font in Microsoft word.
2. Choose 16 point font size.
3. Type 3 fourth grade level stories.
4. Print out copies for classes.
5. Repeat steps 3 and 4 using 14 and 12 point font sizes.
6. Divide one class into three sections.
7. Have each section read a story in a different font size.
8. After five minutes, have them take a story-based quiz.
9. Record results.
10. Repeat steps 6-9 for each class.
11. Analyze results and draw conclusion.
12. Record all results on the display board.

1-Computer
1-HP Printer
3-Fourth grade level stories
1-Comprehension test for each story
Enough for stories and tests for each classroom

**Results**
Overall, the font size that is best for readability is 12 point type size. I believe this is because when you read 12 point font size, you do not have to read as many lines. The lowest score was 14 point type size.

**Conclusions/Discussion**
I believed that 14 point type size would have the best affect on reading comprehension. The experimental data did not support my hypothesis. 12 point type size produced the highest test scores. I believe that it is because there are more words in one line so that less lines need to be read.

**Summary Statement**
This project tested the effect of font size on story readability for middle school students.

**Help Received**
My teacher, Mr. Scott, gave me specific directions on my project. My mom helped me through the tedious exercise of typing. My dad helped with the table, charts, graphs, and display board. Other teachers let me do the experiment in their classes.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**

Rishika Singh

**Project Number**

**J0620**

**Project Title**

## Eyes, Nose, or Mouth: Measuring Their Effectiveness in Face Recognition

**Abstract**

**Objectives/Goals**

The objective is to find out which facial features help the most in face recognition.

**Methods/Materials**

In the initial procedure, respondents had to remember the names and faces during the test. Because memory played a role in this setup, the method was redesigned. In the final procedure, 50 respondents were given two sheets of paper containing a total of ten pictures, two each for five different faces. Then, they were given 15 cards with the "eye" features of the five faces (3 per face) and asked to recognize the face within 30 seconds. This step was repeated for the remaining feature sets in the following order: nose, mouth, eyes and nose, nose and mouth, and lastly all three together. Finally, the respondents rated their familiarity with the five faces on a scale of one to ten.

**Results**

Measurement of average precision showed that eyes were the most effective at face recognition. Paired t-tests indicated the following ordering of features in increasing effectiveness: nose, mouth, eyes, nose and mouth, eyes and nose, and finally all three features taken together. When comparing across gender, males generally had a slightly better average precision. There was a wider variance in males than in females. When comparing across age groups, kids and adults were split evenly at recognition. Variances were small and similar across age groups. Finally, there was a strong correlation between familiarity and recognition.

**Conclusions/Discussion**

The eyes clearly helped the most in face recognition. Comparative performance of the features was maintained across gender, age, and level of familiarity.

**Summary Statement**

Facial features (eye, nose, mouth) were compared for their effectiveness in face recognition.

**Help Received**

Parents helped with editing and data analysis; Prof. Manjunath (UCSB) and Dr. Zuliani helped with procedure, presentation, and analysis.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Sarah M. Stauffer

**Project Number**
**J0621**

**Project Title**
## The Effect of Gender on the Stroop Effect

**Abstract**

**Objectives/Goals**
The objective is to determine if gender has an effect on the Stroop Effect.

**Methods/Materials**
Informed consent was obtained from 200 students, 100 boys and 100 girls ranging in age from 12-15. Each person took 3 timed tests on the computer. Test #1 was a control test for color recognition. Test #2 was a control test for word recognition. Test #3 measured the Stroop Effect for each person.

**Results**
For test #1, the control for color recognition, the girls scored an average of 9.73 out of 10 in 14.8 sec. while the boys scored an average of 9.31 out of 10 in 14.5 seconds. In test #2, the control for word recognition, the girls scored 9.9 out of 10 in 11.9 sec. while the boys scored and average of 9.79 out of 10 in 11.7 seconds. When testing for the Stroop Effect, test #3, the girls scored an average of 8.61 out of 10 in 15.3 sec. while the boys scored an average of 8.51 out of 10 in 16.5 seconds.

**Conclusions/Discussion**
Using 10% confidence intervals, the results show that there is no significant difference between males and females for color recognition, word recognition or the Stroop Effect. The slightly higher scores by the girls may suggest that the girls are better readers or slightly more focused.

**Summary Statement**
This project is about the effect of gender on the Stroop Effect.

**Help Received**
My science teacher, Mrs. Harris helped me organize my data to be made into graphs.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Xeni A. Tziouvaras

**Project Number**
**J0622**

**Project Title**
## Pitch'ure Perfect

**Abstract**

**Objectives/Goals**
My objective was to discover whether different gender, musical experience and confidence will affect a child's ability to sing on pitch. I believe a girl with several years of musical experience and a sufficient amount of confidence will be able to sing accurately. My research helped me to learn the different abilities of the human voice and vocal chords, which further sparked my interest in singing.

**Methods/Materials**
My list of materials included one questionnaire for each test subject (40 in all) which had general questions. I also used a chromatic tuner to find whether my subjects sung on pitch, flat or sharp. In addition I recorded the E,F,G note sequence in two octaves. I also had a playback device for the note sequences and finally, 10 test subjects for each of my categories. First, I gave each participant a questionnaire which they answered immediately and I collected. Then I played the note sequence which corresponded to their vocal range and allowed the subject to practice singing it. Then I played the notes a second time, and while the subject sang them and I used my chromatic tuner to find whether they were sharp, flat or on pitch.

**Results**
My results for my first group, girls with musical experience, did not really surprise me. As a whole, they sang 24 out of 30 notes on pitch, or 80% of the notes. My second group, girls with musical experience, had a lower percentage of notes sung on pitch, only 43.3%. My third group, boys with musical experience, had an identical percentage of notes sung on pitch as my first group, with 80%. My fourth and last group, boys without musical experience, had the lowest percentage of notes sung on pitch, with only 40%.

**Conclusions/Discussion**
My hypothesis did support my results, but only partially. It failed to include the fact that both my first group and my third group would have an identical percentage of notes sung on pitch. I also found that people with musical experience sing more accurately than those without it. In fact, my first and third groups' percentage of notes sug on pitch (80%) was twice as much as my fourth group's percentage (40%). My second group's percentage was just slightly higher than my fourth group's, with 43.3.%, so it was practically half as much as my first and third group's results as well.

**Summary Statement**
My project was about finding whether gender and musical experience affect a child's ability to sing on pitch.

**Help Received**
Father helped me create graphs; my science teacher helped me revise my hypothesis and question.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Maribeth M. Villanueva

**Project Number**
**J0623**

**Project Title**
## The Questioning of Subliminal Messaging

**Abstract**

**Objectives/Goals**
The objective of this project was to test which method of subliminal messaging is more effective in humans; audio or visual. I believed that audio stimulus containing subliminal messages would have more influence or response than visual stimulus containing subliminal messages on a test group of adults.

**Methods/Materials**
A test group of 20 adults, 10 males and 10 females, in the age range of 35-45 years old gave informed consent for exposure to subliminal messaging in both audio and visual formats. Each test subject listened to an audio stimulus with subliminal messages focused on enjoying housework for 15 minutes each day over a period of 5 days. All test subjects also watched a video stimulus containing subliminal messages that focused on becoming a better dancer for 15 minutes each day over the same 5 days. Both the audio and visual stimulus contained images or sounds from nature with the subliminal messages added to them. The test subjects were directed to expose themselves to this material in a quiet, comfortable room while in a sitting position 30 minutes prior to bedtime. Each test subject on each of the 5 days recorded responses to the stimuli on a non-biased survey.

**Results**
The results of my experiment showed that 45% of the test subjects responded to or were influenced by the audio stimulus, but only 10% responded to the visual stimulus. 45% of the test subjects recorded no response to either stimulus.

**Conclusions/Discussion**
According to my results, my hypothesis was supported. This type of testing is important because many people are looking for more natural ways to change bad habits, raise self-esteem, or improve mental and physical health without the side effects that can be associated with the use of drugs and medications. My data supports the idea that such change can be achieved with the use of subliminal messaging. My testing and research raised new questions for me about different learning styles in humans, which lead me to further my experiment by investigating the learning styles of my test subjects to see if there might be a relationship between one's learning style and the recognition of the subliminal messages. My investigation did not confirm such a relationship, but opens the door for further research in this area.

**Summary Statement**
This project was conducted to determine whether the use of subliminal messaging is more effective when presented as an audio stimulus or a visual stimulus.

**Help Received**
Mother purchased, downloaded, and made copies of testing material as well as proofread and typed report; Science Fair Advisor provided guidance throughout project; Mentoring provided by Lisa Arreola and Roger Williams.

# CALIFORNIA STATE SCIENCE FAIR
## 2009 PROJECT SUMMARY

**Name(s)**
Erin N. Vistnes

**Project Number**
**J0624**

**Project Title**
## Dumb Blonde: Fact or Fantasy?

**Abstract**

**Objectives/Goals**
Everyone knows the joke about dumb blondes. Are blondes really dumber than non-blondes? I think blondes are at the same intelligence level as any non-blonde person.

**Methods/Materials**
I constructed a small test to evaluate intelligence. It contained 5 questions from the MENSA website. I also rated my subjects hair color on a scale from 1 to 5. If they were considered a 1, they had black hair. A 5 was really blonde. To conduct my experiment, I asked random adults in my town to take my test. I did not tell them what the experiment I was doing was, in case that influenced the results. I gave the subject 90 seconds to complete as many questions as they could. After they handed me back the test, I rated their hair color. After all 50 tests were taken, I tallied how many each hair color group got correct on average.

**Results**
The average numbers correct for each hair color group were: 1: 2.6; 2: 2.4; 3: 2.5; 4: 2.7; 5: 3.0. Although it seemed like blondes were actually smarter than non-blondes, I couldn#t be sure yet. I used the ANOVA statistical test. According to ANOVA, the significance of the differences did not reach a 10% level.

**Conclusions/Discussion**
In my hypothesis, I expected that blondes are just as smart as non-blondes. According to my results, I was correct. Blonde haired people are at the same intelligence level as people who are not blonde. I was also very interested in the psychological side of my experiment. Many of my subjects complained at the difficulty of the test#s questions, when even I, as an 11 year old, could do them with a little effort.

**Summary Statement**
I gave a small test to determine whether the #dumb blonde# joke is true: if blondes aren#t really as smart as non-blondes. Blondes proved to be as smart as any other person of different hair color.

**Help Received**
My dad helped me with statistics, and timed the test takers.

# CALIFORNIA STATE SCIENCE FAIR
# 2009 PROJECT SUMMARY

**Name(s)**
Sean M. Ward

**Project Number**
**J0625**

**Project Title**
## Do All Witnesses Remember the Same Details at a Crime Scene?

**Abstract**

**Objectives/Goals**
To find if witnesses are useful during an actual crime scene.

**Methods/Materials**
You will need a journal, witnesses, set-up scenes, and a camera(optional).

**Results**
The responses were very accurate and crazy at the same time, some responses were exact and some were off.

**Conclusions/Discussion**
At the end of the project, I concluded that eye witnesses are not always the best witnesses.

**Summary Statement**
After setting up a scene, we asked the witnesses what they saw during an event.

**Help Received**
Mother helped set up scenes;