



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Emily H. Birnbaum	Project Number S0301
Project Title Do People Perform on Tests the Way They Think Is Expected of Them?	
Abstract Objectives/Goals My objective was to determine whether people's belief about what is expected of them affects their performance on a test. Specifically, I was testing the hypothesis that when given a test, people who are told that the test is difficult will score lower on the test than those who are told that the test is easy. Methods/Materials The test, consisting of 14 SAT questions, selected for medium difficulty, was given to three groups of 20 9th graders of similar socio-economic background from my high school. Only verbal SAT questions were used because 9th graders may have different math backgrounds since some have completed Algebra I and others have not. The SAT was chosen because it is designed to be an unbiased test. An equal number of boys and girls were tested in each group. One group was told that the test was extremely hard and that people scored poorly; another that it was very easy and that people did well; the third group, the control, was told nothing about the difficulty of the test. Results The results: for the hard test, the median was 6 correct; the average correct was 43.57%; for the easy test, the median was between 8 and 9 correct; the average correct was 63.21%; for the neutral test the median was 7 correct, the average correct was 51.07%. I analyzed the data using an Excel software program. That analysis showed the difference between the test results were statistically significant with P values much less than .05. Conclusions/Discussion These results support my hypothesis that when given a test, people who are told that the test is difficult will score lower than those who are told that the test is easy. This experiment has important implications for both teachers and parents. For example, if teachers knew that what they said about students' performance could have such an impact on their school work, they might be more careful to remain positive and encourage students to study and do well. It might also help parents to know that setting high expectations, statistically speaking, may benefit their children's performance.	
Summary Statement This experiment was designed to test whether people's belief about what is expected of them affects their performance.	
Help Received My father helped me edit the final report; my mother helped with the computer graphics; my advisor helped me run the Excel program.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Allyson Buescher; Gemma Ypparila	Project Number S0302
Project Title Touchy Feely: A Project on Diabetes and Neuropathy	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of our project is to find out if one's skin nerve receptors sensations differ between diabetic's and non-diabetic's, females and males, and diabetics that have been diagnosed for a longer and shorter periods of time.</p> <p>Methods/Materials The method we used was one of the sixty subjects would run their right hand briefly over the square shaped sandpaper measured in 220 grits, the circle measured in 150 grits, the star measured in 100-c grits, and lastly the heart measured in 60 grits. The higher the number in grits, the smoother the sandpaper is. The subjects would then fill out a small packet with questions asking personal information like sex, age, and if they were diabetic. It also inquired which piece of sandpaper felt the smoothest, the roughest, and if there was a small difference, a large difference, or no difference at all between the sandpaper pieces. The control experiment was testing non-diabetic people, the independent variable was the different grits of sandpaper, and the dependent variable was the person's sex and severity of their diabetes.</p> <p>Results In result to our project, 69 percent of females chose which piece of sandpaper was the roughest and the smoothest correctly while only 44 percent of males chose correctly. 71 percent of diabetics diagnosed for ten years and under chose which piece of sandpaper was the roughest and smoothest correctly while 39 percent of diabetics diagnosed for over ten years chose correctly. Overall, diabetics had a harder time detecting a difference between the sandpaper pieces than non-diabetics. Only 55 percent of the diabetics chose correctly while 90 percent of the non-diabetics chose correctly.</p> <p>Conclusions/Discussion The results of the project proved that the hypothesis was correct. The females were more sensitive to the differing textures than the males, and the longer the diabetic had been diagnosed for the harder it was for them to tell apart the different grits of sandpaper. Overall, the diabetic subjects had a more difficult time telling the differences in texture as opposed to the non-diabetic subjects.</p>	
Summary Statement Touchy Feely tests whether or not non-diabetic subject's skin nerve receptors will be more sensitive to touch than diabetic subjects.	
Help Received Venessa Buescher helped test subjects	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Lynnea M. Dally	Project Number S0303
Project Title Propaganda and Its Effects on Varying Ages	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My goal was to discover which age group, Children, Teenagers or Adults would be most effected by propaganda.</p> <p>Methods/Materials I wrote a survey with nine questions pertaining to smoking and how serious a problem smoking is. I gave all test subjects from all ages this survey and recorded the results. I then talked to them about how thoroughly I had to research smoking and then propogandized negative things to them about smoking The test was administered a second time and differences were noted. Test subjects were not told prior to testing that they were given a propoganda test and all steps were taken to ensure in the subjects mind the survey was purely anti-smoking.</p> <p>Results All age groups changed their answers on the surveys reflecting propoganda influence. Children were influenced the least by me with a 7% change, Teenagers were influenced more and changed their answers by 10% while Adults changed their answers by 11%.</p> <p>Conclusions/Discussion Children changed the least because they are the age group which is subugated the most to anti-smoking propoganda daily. Their negative views upon smoking were already so high it was physically impossible for me to influence them any more. Adults and teens are less exposed to anti-smoking propoganda and their views upon smoking may not have been so serious leaving a margin for improvement. If I were to do this project again, I would test upon something harmful but not very aggressively propogandized such as mercury levels in fish.</p>	
Summary Statement My project is aimed to discover which age group is most suceptable to propoganda.	
Help Received No help received.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Cadence Ellington-Meaney; Ariana Stein	Project Number S0304
Project Title How Do Cell Phones Affect Teens' Reaction Times?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of our project was to determine if cell phone usage, while driving, affects teens' reaction times.</p> <p>Methods/Materials We randomly selected fifteen boys and fifteen girls from ages fifteen to eighteen with driving experience. We constructed an apparatus which consisted of: an electronic timer, a button placed at foot level, a button placed at hand level, two lights placed in the test subject's peripheral vision, electrical wire and two AA batteries. We recorded the test subject's four initial reaction times and then compared them to their four reaction times while holding and talking on a cell phone.</p> <p>Results It takes teenagers, on average, 51%-57% longer to react while talking on a cell phone.</p> <p>Conclusions/Discussion Our conclusion is that cell phone usage while driving greatly affects the driver's reaction time, therefore putting themselves and others in danger.</p>	
Summary Statement How do cell phones affect teens' reaction times?	
Help Received Father helped make the apparatus. Cadence's Grandfather helped with the graphs and analysis.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Marianne E. Galligan-Oltmann	Project Number S0305
Project Title Creating a Culture of Fear in America	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The American public is bombarded with information from a variety of sources, including newspapers magazines, television, and radio. The media tends to report a story with such intensity, reporting the most emotive and shocking aspects of the issue. Most people can't fear something until they know it exists, and examples of this would be shark attacks, AIDS, the #deadly# flu, SAR#s, Mad Cow disease, and other epidemics. In my project I intend to highlight the three high profile topics of shark attacks, AIDS, and the #deadly# flu.</p> <p>Methods/Materials Select three high profile topics in the media. Search the Internet for the number of article that can be found on each topic for a certain year. Find data for the three topics from more reliable sources. Review information and compare statistical data with frequency that topic appeared in the media.</p> <p>Results Simple Analysis shows that there are many popular stories in the news today that produce pseudo fears. According to the chart from IFSA the #summer of the shark,# according to my research, the media published most of the articles on shark attacks the years after the #summer of the sharks.# According to my graph from the California department of public health, the flu mortality rate was at its highest ever in 1999- 2000 where the media produced only 6 articles between all 3 sources over the past 2 years. In 2003 the flu received the most media coverage of all the 6 years. The media published AIDS greatest number of articles in 2001 when mortality rates were declining.</p> <p>Conclusions/Discussion I conclude that some topics are reported with greater frequency and intensity regardless of actual statistics and factors. The flu, shark attacks, and AIDS were more deadly in years prior to the years that the media reported with a frenzy and greater frequency. Shark attacks have declined since the year 2000 in the #year of the shark.# Regardless of the threat of unavailible vaccines and a more virulent flu virus, admissions to the Kaiser Hospital System in Southern California this year were not as high as 1999-2000. While AIDs is a serious disease research proves that it is decreasing more and more each year. The intensity and sensationalism of the articles add to our awareness, but also our fears.</p>	
Summary Statement To prove that the media often exaggerates and manipulates information as a form of scare tactics in order to make a story more interesting.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Jamie M. Gallo	Project Number S0306
Project Title Target Training	
Objectives/Goals Target Training is a training method used on dolphins and I wanted to see if it would work on dogs too. The goal of the training was to get the dogs to touch their nose to the target and also to keep it there until they hear the clicker, which is their reward!	
Abstract Methods/Materials I spend five minutes three times for three days teaching my Black Lab and German Shepherd (they were my independent variables) that when they turned their head from a bag of food, they would hear a click, which was their reward. By the end of the phase the dogs associated the clicker to mean that they did the action correctly. The click was their reward. Then, spending the same amount of time, I taught each dog to touch his nose to the hand-held target every time I said #target#, then clicked for the reward. This lets the dogs associate the word target to mean touch the target and the click is their reward. Now it was time to teach the dogs to touch and keep their nose to the stationary target. When they heard a click, which was their reward and release! / Two dogs A clicker A hand-held target A stationary target A small bag or fanny pack A box of small dog treats	
Results Both the dogs I tested my methods on supported my theory. The German Shepherd started learning at the beginning of each phase and excelled dramatically in each phase. The Black Lab was much more hyper and required patience. They both learned Target Training from the training methods used on dolphins. Through the Target Training, my subjects learned to hold their nose to the target when I tell them to and know that the clicker means they are done and did a good job!	
Conclusions/Discussion I have only done my tests on two subjects, so I am not in a position to confirm this training method on dogs, but from the subjects so far, I believe that this is a great training technique for dogs!	
Summary Statement Target Training is were I step by step (using three, three day phases) taught two dogs (separately) how to hold their nose to a stationary target, going to it when I said "target", and holding it till they heard the click (their release).	
Help Received I had no help with my project	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Azeem M. Ghoury	Project Number S0307
Project Title Tendencies of the Human Mind: The Human Psyche	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Due to psychological implications, one would tend to assume that there are vast differences in the views/perspectives of individuals, shaped by external influences such as religion, media, political influences, and cultural influences. The understanding of these trends of influence aids the understanding of the human psyche, and how certain decisions are made in context of these external influences. Consider the situations of pedophiles, terrorists, delinquent children, and "school bullies," for example, to address the "immoral" extremity of this spectrum of human characteristics. The purpose of this project is to address the concept of bias, stereotype, and to highlight the influence certain forms of media/propaganda have on the individual. These influences may lead to a statistically significant bias in the total population, and thus reveal the undeniable influence external sources have on the individual. One formulates ideas through these influences and thus is compelled by these sometimes subtle forces to act/react to certain situations/dilemmas in utterly arbitrary ways. This tendency of the individual to make arbitrary decisions is the focus of my project, as it first gathers information on these decisions, and then analyzes the significance of the gathered information.</p> <p>Methods/Materials Ti-83 Calculator Surveys to be distributed P-value table for Chi-squared test Chi-Squared formula</p> <p>Results All 4 tests reveal statistically significant results with all p-values less than .25, three p-values under .15, and one p-value less than .05. Thus, significant results were calculated at the end of the experiment.</p> <p>Conclusions/Discussion There is significant evidence to confirm the notion that the population's views are biased. There are two sides of a spectrum concerning these issues typically, and though these procedures are always subject to human error, by assuming our .5 p-value as our basis of comparison, I have calculated a statistically significant discrepancy between the recorded values and the expected proportion. Thus one is left to conclude that due to the basis of comparison being severely deviated from, the experiment has revealed there are significant psychological and behavioral implications at hand. From this experiment, one has merely deduced evidence of the existence of such biases. It is up to inference as to determining from where these biases arose.</p>	
Summary Statement This project is an examination of the human mind, and how the abstract thought process is subject to influences from the potential sources of society, religion, culture, etc., all playing a pivotal role in our established views/perceptions.	
Help Received	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Lindsey S. Gosselin	Project Number S0308
Project Title The Effects of Classical/Pavlovian Conditioning on <i>Dionaea muscipula</i>	
Abstract Objectives/Goals The purpose of this experiment was to determine if conditioning, a process usually believed to require thought, could be done on organisms with no cognitive ability. Conditioning, or at least Pavlovian conditioning, is simply the linking of two stimuli for an organism, so that eventually it will react the same way to both. It is possible, however that this logic linking process is actually simple chemical adaptation - organisms can adjust to differing situations, to a point. Methods/Materials <i>Dionaea muscipula</i> , as a plant, has no brain with which to perform cognitive processes. Its quick reaction to stimulating its traps made it desirable; I wanted to be able to see with some certainty what stimulus caused what reaction. I managed to locate enough plants from the same source, and I set them up in a container with all they needed to grow healthily - proper water amounts, humidity, etc. - information garnered from earlier research. I conditioned the experimental subjects by exposing them briefly to a high-temperature heat source for 90 seconds, then quickly activating their trigger hairs with tweezers and a cricket. Two control specimens were heated, but fed randomly, and two were not heated. Later I tested the effects of the conditioning by exposing all of the subjects to the heat source (without stimulating the hairs afterwards) and observing the result. Results When the test of conditioning was performed on the plants, there seemed to be no effect. The subjects (experimental and control) did not appear to react to the heat stimulus. One specimen (#4, heated control) did close one trap, but I believe this was triggered accidentally while being moved. One observation I made, however, was that the experimental plants appeared to close more quickly, when they were stimulated later after heat exposure, than did the controls. Conclusions/Discussion The test of the effects of conditioning did not support the idea of conditioning being possible in organisms that cannot think. However, one detail, the quicker closing speed of the conditioned plants, warrants further testing. Far more rounds of conditioning will be needed to give strong support to the idea that conditioning does not require cognitive processes. As it stands now, the idea appears to be incorrect. But the differing speeds of these plants reactions after conditioning certainly leave the possibility open.	
Summary Statement This experiment tested the concept of using Pavlovian conditioning to associate a temperature stimulus to	
Help Received My parents helped to procure the plants I needed, and pay for the materials I did not have.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Ilang M. Guiroy	Project Number S0309
Project Title How Does Learning Modality Predict SAT Scores?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this study was to find whether learning modality has an impact on SAT scores, and if so how.</p> <p>Methods/Materials A test was developed in order to identify the learning modality of the subject tested. It consisted of a power point presentation on which characters were presented in each of the three modalities. At the end of each section the subject was asked to identify them.</p> <p>For the experiment the subject was asked to take the test. The worksheets were evaluated and the results were analyzed.</p> <p>Results It was found that students with higher SAT scores were multimodal. Students with upper midrange SAT scores were highly modal and showed to be mostly visual. Students with low range SAT scores were found to be less modal.</p> <p>Conclusions/Discussion The upper range SAT scorers were either naturally multimodal or learned to cope very well, making it easier for them to understand material presented in class, and later asked on the SAT. Students with midrange SAT scores were probably visual students who did not need to learn to cope quite as much. Students with low range SAT scores were probably highly modal, but learned to cope, though not as well as those with upper range SAT scores.</p> <p>Students learn best in different ways. If classes could be taught to benefit all the students, performance would improve and comprehension of the material would increase.</p>	
Summary Statement This study is about how learning modality impacts SAT scores.	
Help Received Mother drove to colleges. Dave Murray explained the statistics utilized in this project.	



CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

Name(s) Anu K. Gupta	Project Number S0310
Project Title Living Without Stress	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective is to find a solution to stress. One of the main causes of high blood pressure today is stress. I am evaluating the effect of the Yogic Technique # Deep Relaxation Technique(DRT) and Music on one's stress level measured by three factors: Blood Pressure, Heart Rate, and Respiratory Rate. I will be using cardiac patients, regular subjects, and Yoga practitioners to test stress reduction. I hypothesized that DRT will be most effective in reducing stress because it is a conscious process that relaxes one's mind.</p> <p>Methods/Materials Three groups consisting of 201 subjects were taken over a 4-month period. I used automatic blood pressure and pulse monitors, recorded my voice into a tape recorder used for doing DRT, and bought a classical music CD. Both were done for 12 minutes. A stopwatch was used for measuring respiratory rate. For subjects, I went to the houses of people, the Heart Center, and a yoga class. In all, I took 107 Regular Subjects, 64 Cardiac Patients, and 30 Yoga Practitioners. Yoga practitioners are people who have been doing yoga for at least two years, twice a week. The yoga class was given the yogic relaxation which was compared against them just lying down for the same period of time. They were given the yogic relaxation which was compared against their is experiment on them twice over 2 weeks period. Regular Subjects were those who did not practice Yoga or have a history of high blood pressure. I conducted the two experiments along with the control on this group. The final group consisted of Hypertension Patients (Non-Yoga) who had no history of yoga who were divided into 3 groups as they could not come 3 times for the different experiments. Out of 60 patients, and equal number did the music and yoga relaxation as well as the control.</p> <p>Results Although DRT led to a reduction in the blood pressure, pulse, and respiratory rate in all groups, the degree of reduction was greater in Yoga than with other techniques. I also found that if one does Yoga regularly, this technique is likely to benefit them more than it would benefit a person who is doing it for the first time.</p> <p>Conclusions/Discussion Overall, the data supported the hypothesis. Not only does this prove to be beneficial for those currently suffering from hypertension, it also helps normal people who constantly carry the load of distress and anxiety (the root cause of high blood pressure and associated other medical problems).</p>	
Summary Statement To compare the effects of Music and Yogic Relaxation Technique on Blood Pressure, Heart Rate and Respiratory Rate.	
Help Received Father helped me understand project and	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Kylise J. Hare	Project Number S0311
Project Title Siamang-Orangutan Interactions	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Orangutans and siamangs live in the same forest levels of the Sumatran rainforests, yet little is known about their interactions with each other and most of what is known is from anecdotes. This study was conducted to examine the intra- and interspecies interactions between the siamangs and orangutans recently (May 2003) housed together at the San Diego Zoo.</p> <p>Methods/Materials Thirty-eight hours of data on the interactions between the three siamangs and seven orangutans were taken in July and August, 2003. "Friendly" and "Nasty" behaviors were analyzed.</p> <p>Results Each species exhibited more "Friendly" behaviors towards their conspecifics than towards the other species. The siamangs exhibited more "Nasty" behaviors towards orangutans than orangutans exhibited towards siamangs.</p> <p>Conclusions/Discussion The hypothesis was rejected because the two apes did not generally ignore each other. Fifty-eight percent of the total siamang interactions were with orangutans and 39% of the orangutans# interactions were with the siamangs.</p>	
Summary Statement The interactions between the orangutans and siamangs at the San Diego Zoo.	
Help Received Zoo Keeper Laura Debnar introduced me to the animals; researcher Valerie Hare advised me on my study design; architecture student Azlynn Hare drew exhibit maps for me.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Laura A. Huppert	Project Number S0312
Project Title Shape vs. Color Phase II: Do Similar and Alternating Patterns Take Precedence Over Shape or Color Primary Perception?	
Abstract Objectives/Goals The objective of this experiment is to determine whether similar or alternating patterns take precedence over the subject's shape or color primary perception. I hypothesized that most subjects would respond based on the sequence patterns, rather than their original primary perception of shape or color. Methods/Materials Informed consent was obtained from 100 randomly selected people, 50 men and 50 women, in three locations. A control test was developed where a trick card (a heart playing card with the hearts colored black) was quickly shown to the subject for identification of its suit. Subjects that responded by saying "hearts" noticed the shape of the black heart first while those that said "spades" noticed the color first. After establishing the subject's shape or color primary perception, two more tests were administered: one that contained similar patterns (multiple cards of the same suit in a row) and one that contained alternating patterns (rotating between two suits). The trick card was placed at the end of the pattern sequence. When the subject named the suit of the trick card this time, their response could be compared to their answer in the control test to determine whether patterns overruled their shape or color primary perception. Results When comparing the responses from the control test to the pattern tests, it is clear that many subjects followed patterns rather than their shape or color primary perception. For the Similar Trick Card Test, 35% more of the subjects responded "hearts," following the pattern, than in the control test. For the Alternating Trick Card Test, 48% more of the subjects responded "spades," following this pattern, than in the control test. Females were far more affected by the alternating pattern and males were more affected by the similar pattern. Conclusions/Discussion My conclusion is that most subjects notice patterns before their shape or color primary perception. The data collected suggests that the designers of advertisements, web pages, and educational tools should utilize patterns effectively to catch the consumer's eye.	
Summary Statement This project tests whether subjects notice patterns before their shape or color primary perception.	
Help Received None	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Trevor Kimball; Greg Wiese	Project Number S0313
Project Title Laser Fluorescence Detection of Dental Caries	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This study was performed in order to determine if laser fluorescence is a more effective means of detecting occlusal caries, or decay on the tooth's surface, than the standard procedure currently in use by dentists.</p> <p>Methods/Materials Ten extracted posterior teeth, without dental restorations, were selected to ensure the presence of questionable occlusal caries. Each tooth was tested for occlusal caries by five dentists, who used a new Brasseler dental explorer to perform routine visual and tactile caries diagnosis. Laser fluorescence caries detection (KaVo's DIAGNOdent) was then used to diagnose each tooth. The ten teeth were sectioned using a high speed dental handpiece and diamond bur, and then visually analyzed for the presence of caries. The presence or absence of dental caries was compared to the diagnoses of the dentists and DIAGNOdent.</p> <p>Results The dentists were correct in their diagnoses only 84% of the time (with a range from 60% to 100%), while the DIAGNOdent was 100% accurate in diagnosing occlusal caries.</p> <p>Conclusions/Discussion In recent years a new trend in dental caries has developed, in which the wide spread use of fluoride has resulted in harder enamel surfaces, causing many occlusal caries to go unnoticed. These caries, called "hidden caries," can be difficult, if not impossible, to detect using the standard visual, tactile, and radiographic techniques. While our sample size was small, the data indicates that the DIAGNOdent, by KaVo, may be essential to the proper diagnosis of occlusal caries in the future.</p>	
Summary Statement Our study was to determine whether laser fluorescence is a more effective means of detecting occlusal caries, or tooth decay on the surface of a tooth, than the standard procedure currently used by dentists.	
Help Received Dr. Kimball helped with using dental equipment; Dr. Kimball, Dr. Springe, Dr. Campbell, Dr. Barbieri, and Dr. Micheal diagnosed teeth; Dr. Naffah, Dr. Phillips, Dr. Spano, and Dr. Lacy donated teeth.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Kaitlin A. Kirk	Project Number S0314
Project Title Spatial Reasoning Abilities: Chess Players vs. Non-Chess Players	
Abstract Objectives/Goals For this science fair project, this young researcher wanted to conduct an experiment that studied spatial reasoning abilities and how these abilities can be related to chess. The objective of this experiment was to test my hypothesis: Individuals who participate regularly in strategy games--specifically tournament chess players in this study--will have spatial reasoning abilities that are measurably superior to individuals who do not regularly participate in these activities. Methods/Materials Before beginning the actual testing, each subject was interviewed to collect demographics for the research and analyze variables that could affect the outcome of the experiment. The demographic information included: name, gender, and age. Other information requested included: highest math level completed, tournament chess player (or not) and rating (assigned by the United States Chess Federation), etc. The instructions for the experiment were read and the demo card was shown to the subject. The blocks required for the task were placed on the table, then the stopwatch was started and the diagram card for the task was shown to the subject for 10 seconds. After removing the card from view, the subject was instructed to #START# and timing was continued. The stopwatch was stopped and the time was recorded when the subject stated he/she was #FINISHED.# To derive the actual time a subject spent on a task, 10 seconds was subtracted from the total time elapsed. To determine block placement accuracy, the number of incorrectly placed blocks was recorded and the percentage correct was derived at a later time. These steps were repeated for each task until all 6 test trials had been administered. Results Total task time and total accuracy percentage was derived for each subject and an average composite score for each subject was computed based these two figures. Chess players were 16.1% faster and 12.6% more accurate than non-chess players with an average composite score 30.8% better than non-chess players. Data was also analyzed for the relationship between self-reported math skill level, age, level of math courses completed, and gender. Conclusions/Discussion Overall, the data did support the hypothesis. The results show that the spatial reasoning abilities of chess players are measurably superior to individuals who do not regularly participate in these activities.	
Summary Statement This experiment compares the spatial reasoning abilities of chess players vs. non-chess players.	
Help Received My parents helped purchase all project materials and my mother helped edit my paper.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Wendy Mak	Project Number S0315
Project Title Can Children Taste without the Credibility of Sight?	
Abstract Objectives/Goals The objective of this experiment is to determine the role color plays in children's ability to identify the flavors of beverages. I hypothesize that when children are presented with drinks with color-flavor conflicts, their level of accuracy in flavor identification decreases. Methods/Materials The Certification of Compliance for Research Involving Human Subjects was completed to test a total of 18 children and four adults. Five drinks were prepared using Kool-Aid mixes: Charming Cherry, Grape Illusion, orange, strawberry, and Arctic Green Apple. The first taste test I conducted only consisted of the two drinks with color-flavor conflict and the orange drink to verify the tester's tasting abilities. For a second test I conducted, I added the two regular strawberry and green apple drinks. In both cases, testers were given the drinks one at a time with original crackers in between to clear the mouth of any remnants of the previous flavor. The four adults were tested the first time to ensure that the flavors are actually distinguishable. Results For both of the children's tests, out of the 36 drinks with color-flavor conflicts, only 2 were correctly identified (~5.6 %). However, when blindfolded, the children recognized 5 of the 16 drinks (31.25%). Although the children's number of identified drinks with color-flavor conflicts seems minimal, the adults 37.5% of identified drinks verify that they could be recognized. Conclusions/Discussion With the data collected, I can conclude that this experiment does verify my hypothesis. Children ages 8-11 do have a deficiency in accurately identifying the flavor of a beverage when its associated color is not compatible with its flavor. Researchers have hypothesized that color may produce a stronger neural response than flavor in the eating process or color is just perceived first. Oram suggests that there is a color biased identification error where testers are either unaware of the conflict or they just cannot ignore what is visually perceived.	
Summary Statement This project demonstrates the fact that children's level of accuracy decreases when drinks contain color-flavor conflicts.	
Help Received Sister helped cut pieces for the display board.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Christopher M. Mangum	Project Number S0316
Project Title Eyeing Autism	
Abstract Objectives/Goals This experiment is to determine if males and females think differently. Moreover, it is to test if women can empathize better than men can, and as a result men are better at systemizing. If men prove to be worse at empathizing, this can account for why four out of five cases of autism are male. Autism is a neurological disorder in which the two spectrums of the brain, empathizing and systemizing, are unbalanced. In autistic people the brain cannot empathize, but systemizes extraordinarily well. I plan to prove that autism is just an extreme of the average male brain. Methods/Materials By giving an exam that requires the test taker to use empathy, I will be testing the test taker's ability to empathize. The test is taken from Essential Difference by Baron - Cohen and the answers were provided in the book. The test taker will have four choices for what emotion a pair of eyes is portraying. It is a 25 question exam. They will mark their answers on scantrons, which will be graded by machine. The materials needed are human subjects, number 2 pencils, the test from Essential Difference by Baron - Cohen, and an answer key. Results The data shows that there is a relationship between gender and the ability to empathize. The females averaged 18.62% higher than the males. Forty-four females, approximately 58%, missed five or less questions on the exam. Only three males missed five or less questions. The average score for women was a 77.5% while men scored an average 58.8%. The data collected overwhelmingly proved that the average man cannot empathize as well as the average female. The results support my hypothesis. Conclusions/Discussion Men have an inherent mental deficiency when it comes to empathizing. There are two major divisions in the brain, the left and the right hemispheres. The left hemisphere is the side humans store language and empathizing skills. The right side is where the majority of spatial cognition and systemizing occurs. If a person is poor at empathizing it can be determined that he or she exceeds in systemizing. My results show that men are much better at systemizing. The average male's predisposition to a systemizing brain accounts for why so many males develop autism while females rarely develop the disorder. Men are more likely to develop autism because this neurological disorder is an extreme version of the average male's brain.	
Summary Statement My project is to meant to determine if autism is an extreme version of the average male's brain.	
Help Received None	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Shanley K. McDonald	Project Number S0317
Project Title Color? Black and White? Which One Do Children Recall the Best?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project tested the short-term visual memory of children at the elementary school level. The purpose of this experiment was to determine how well children recall color or black and white pictures and if this is affected by age or gender.</p> <p>Methods/Materials I tested both boys and girls from grades first through fifth. Each child looked at ten black and white images for twenty seconds. I then took the pictures away and had them write down as many images they could recall. The process was then repeated with color pictures.</p> <p>Results Older age didn't affect the results. Fourth grade boys and girls remembered both color and black and white pictures the best, instead of the fifth graders. Gender did seem to affect the results. Girls remembered both black and white and color pictures better than boys. Color images were, overall, remembered the most, in comparison to the black and white pictures.</p> <p>Conclusions/Discussion I believe that color pictures were remembered better due to all of the color detail. The details, according to my research, help the individuals retain information about each image. I also think that girls remembered more images overall because they tend to be, sometimes, more focused in school than boys are. But, lastly, I'm not sure as to why fourth graders remembered more pictures than other grades.</p>	
Summary Statement My project is about short-term visual memory in elementary school aged children.	
Help Received Mother drove me to and from the Elementary school to perform surveys	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Kyasha Moore; Marquette Moore	Project Number S0318
Project Title What Do You See? A Two-Year Study of Visual and Audio Subliminal Messages	
Abstract Objectives/Goals Subliminal messages are not widely understood, but they are used in different forms of the media, including advertising. Audio, and visual subliminal messages are the dominant types. This project compares the two in order to 1) to determine if subliminal messages affect the observer and 2) determine if there is a difference in impact between the two. Hypothesis-Students exposed to either visual or audio subliminal messages will select the suggested color choice at least 50% of the time. The unexposed control group will select the three colors equally. Methods/Materials Students will first watch a 5-minute movie and then take a survey. The survey asks the students to choose a color. Once the data is collected the results will be averaged to determine if subliminal messages are effective. Materials needed include a movie that includes an embedded subliminal message, and surveys for the students. Results The students had a measurable response to the visual subliminal message. In the control group students chose yellow 0% of the time. The collected data suggests that visual subliminal messages are successful 32% of the time in the elementary-aged subjects. The results of this experiment show that boys reacted to the visual subliminal message 13% of the time and girls reacted 19% of the time. The audio subliminal message is 7% more success than the visual. The total response rate for all subjects to the audio message was 39%. Boys reacted to the subliminal messages 15% of the time and the girls reacted 24%. Conclusions/Discussion The data do not support the hypothesis; the unexposed students did not choose the colors equally. Nor did the students exposed to the subliminal messages choose the suggested color 50% of the time. The project failed to support the hypothesis. The data suggests that there is little or no difference between random selections (33% for each color) and the results of the subliminal messages. (32% and 39%) Statistically there is likely no difference between using subliminal messages or not using the messages.	
Summary Statement This two-year study will compare the effectiveness of visual and audio subliminal messages.	
Help Received Father helped create embedded subliminal messages.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) James D. Nelson	Project Number S0319
Project Title The Effect of Altered Spelling and Grammatical Structure on the Reading Speed of Adult Males	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to determine the visual process predominantly used by adult readers.</p> <p>Methods/Materials Five poems by Pablo Neruda were selected and translated from Spanish to English. Each was adjusted to contain exactly 140 words in 20 lines. All five poems were then given to pre-test subjects, which were not involved in the experimental testing, to ensure all of the poems had the same average reading time of 40 seconds. One poem was altered to test trigger shapes, one to test word order, one to test inner word spelling, and one to test word recognition. One poem was left as it was at this point, and used as the control. These five poems were then issued to each of ten test subjects. Each subject read each poem one at a time, and was timed in doing so. This was done with a standard sports stopwatch. The completion times for each poem and test subject were recorded. The test subjects were anonymous.</p> <p>Results The poem testing inner word spelling had the largest increase in reading time. This shows that the letter order within words is important, and the first and last letters of each word are not the only letters recognized by the human mind. The poem testing trigger shapes had a moderate increase in reading time. Trigger shapes, therefore, are used by the human mind in reading, but this is not a significant psychological mechanism. The poem testing word order held only a negligible change in reading time. The order of words is not, therefore, significant in reading. The poem testing word recognition had a large increase in reading time. Word recognition is not only used by readers, but is significantly important in being able to mentally process text.</p> <p>Conclusions/Discussion The hypothesis concerning word triggers and word order was correct. The hypothesis about trigger shapes and inner word spelling were incorrect. Word recognition was found to be the most important visual process used by adult readers. This allows us insight into how the human mind reads, and could additionally serve in the creation of lesson plans concerning child literacy.</p>	
Summary Statement This project explores the psychology of reading through the visual processes used by adult readers.	
Help Received Ten anonymous test subjects and ten anonymous pre-test subjects aided in the collection of data.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Michael Sinanian; Alex Yerevanian	Project Number S0320
Project Title The Recognition of Facial Expressions among Varying Adolescent Populations	
Abstract Objectives/Goals In this experiment, our objective was to determine how different adolescent populations recognize specific emotions at varying intensities. Methods/Materials To test this, we used the entire high school body of AGBU Demirdjian high school, consisting of about 460 students, and administered them a test in which they would anonymously record specific demographic data (age, gender, and approximate GPA) and their interpretations of certain facial expressions. When we gathered the data, we made correlations for the age and GPA and a chi square analysis for the gender. Results The data showed that 1. Age is not a good predictor for more accurate recognition of facial expression. 2. Females are able to more accurately recognize certain emotions (such as fear) as opposed to males. 3. There is no consistent correlation between GPA and accurate recognition of facial expressions. Conclusions/Discussion This can be attributed to certain evolutionary or even neurological reasons. Further testing using a different test group and perhaps more sophisticated equipment would be required to test and pinpoint these reasons.	
Summary Statement This experiment was to determine how different adolescent populations recognize specific emotions at varying intensities, and how differences in the performance of these populations can be attributed to certain factors.	
Help Received Mother helped create board, Partner's cousin conducted statistical analysis, Brother helped type introduction	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Jamie Solomon	Project Number S0321
Project Title Color and a Mouse's Appetite	
Abstract Objectives/Goals The objective is to learn whether the color of a mouse's environment has an effect on the amount of food the mouse consumes. The purpose of this experiment is to learn if there are certain colors that increase the appetite. This information is useful to restaurant owners and other companies who deal with edibles when they are choosing how to decorate restaurants or stores. Methods/Materials Eight mice were placed in eight separate (but identical) cages. Frames covered with colored cellophane surrounded six of the cages. The cellophanes were red, yellow, or blue, and the remaining two cages were the colorless controls. Every day each mouse was given the same amount of food, and the following day the remaining food was weighed in order to determine how much the mice had eaten that day. After three days the each mouse was placed in a different colored environment and the tests were performed again. This happened two more times until each mouse had lived in each color for three days. Results It is statistically significant that the mice in the red environments ate less food than the mice in a controlled environment. There was no statistical significance to the results of the mice in the blue or yellow environments. On average, the mice in the control (at 4.193g per day) ate the most, and the mice in the red environment (at 2.885g per day) ate the least. Conclusions/Discussion The conclusion is that when mice live in a red environment, they eat less than they would normally. If this is applied to humans then it tells us that restaurants should not be painted red.	
Summary Statement Does the color of mouse's environment have an effect on the amount of food the mouse consumes?	
Help Received My parents bought the supplies and helped me figure out what to do when I encountered problems; my younger sister helped clean out cages; Jenny-eighth grade science teacher helped figure out logistics of experiment; employees at Mike's Feed and Pets helped me get the right kind of mice	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Noelle R. Stiles	Project Number S0322
Project Title Intraocular Camera for Retinal Prostheses: Restoring Vision to the Blind	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To design an intraocular camera for a prosthetic device that can be surgically implanted into the human eye to give people with diseases such as Retinitis Pigmentosa and Macular Degeneration the ability to recognize common objects, navigate, and function in the home. I predict that the number of pixels necessary for recognition of common objects will be significantly smaller than that for normal human vision, and that image blurring will improve the recognition of objects.</p> <p>Methods/Materials Research the eye and its optical mechanisms, and generate a design that includes the camera's array, its position, and lens type. Experiment with various lens types and positions, with both computer-aided design techniques and with actual microlenses to determine camera capabilities. Survey people to determine the minimum human requirements for vision and recognition of common objects. Determine the optimal blur and minimum number of pixels for recognition; adjust camera design if appropriate. Create a prototype of the intraocular camera and test its image capture and video capabilities.</p> <p>Model 370330 aspherical lens, Lightpath Technologies; OSLO EDU for lens design; Orange Micro iBOT Firewire Webcam; Corel Photopaint; Microsoft Office; magnifying glass; ruler; BTV Pro Carbon for video captures.</p> <p>Results We found that only 625 pixels are required for object recognition by blind people. Mature subjects (60-80 yrs) needed more pixels for recognition initially but later improved in their recognition abilities. The optimal degree of blur and number of pixels have an indirect relationship, meaning that for a picture with a larger number of pixels, less blur is needed for optimal recognition. The prototype intraocular camera yielded the surprising results that it is focused at nearly all distances, and that a blind individual could navigate and regain mobility with this device. Computer simulations showed that it is possible to replace the crystalline lens with this prosthetic device and have little aberration in the image or damage to the eye.</p> <p>Conclusions/Discussion The results indicate that this project is capable of changing blind individuals' lives. The surgical implantation of such an intraocular camera, which has the potential to help blind individuals navigate local environments, regain mobility, and recognize common objects, might be able to help blind people see within our lifetime.</p>	
Summary Statement We used human psychophysical testing to determine design constraints, and then fabricated and tested a prototype intraocular camera for use in retinal prosthetic devices for surgical implantation in blind patients.	
Help Received Dr. Tanguay and members of the Optical Materials and Devices Laboratory at the University of Southern California helped in teaching me OSLO lens design simulations, and in assembly methods for the prototype.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Abigail J. Vera	Project Number S0323
Project Title Against the Law	
Abstract Objectives/Goals To see which gender is more willing to break the law through a political survey Methods/Materials <ul style="list-style-type: none">. 20 boys and 20 girls. 40 copies of a survey. pen/pencil I first created/designed a political survey comprised of a rough overview of the most recent political issues. Then I tested forty people (20 boys and 20 girls). Afterwards, I added up all of the answers and put them in a table in their appropriate categories (yes/no/depends). I then graphed the "yes" results and did a data analysis through a chi square. Results The male gender was more willing to break the law. There was a 9% difference between the "yes" for the two genders. The boys had a total of 35.5% and the girls had a total of 26.5%. Conclusions/Discussion The male gender was more subject to negative social behavior than the female gender. The male gender was more willing to break the law according to the overall results from the survey.	
Summary Statement my project is about testing for positive and negative social behavior through means of a political survey.	
Help Received my science teacher Mr. Callaway helped me in creating the political survey; he helped me come up with the questions included in it.	



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Andrea C. Wooding	Project Number S0325
Project Title Do Illustrations Make a Difference in Comprehension?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment is to determine if illustrations improve listening comprehension of children in Kindergarten through Fifth grade. My hypothesis is that illustrations will improve the listening comprehension of elementary age children.</p> <p>Methods/Materials An excerpt of approximately 20 pages from a story, appropriate for the grade level, was first read to the class with illustrations shown to the students, and a ten question test given to the students afterwards. Then another excerpt by the same author, from a different book, was read to the class without showing illustrations, and a similar ten question test was given to the students. Testing without illustrations last would weight the test against my hypothesis. I used two classes of each grade level from Kindergarten through Fifth grade at a local elementary school. Class size is about 20 per class in grades Kindergarten-third and 30 per class in grades fourth and fifth. In all 258 students were tested, once with illustrations and once without illustrations.</p> <p>Results In grades first through fourth, illustrations improved test scores, the lower the grade level the larger the difference in comprehension. In fifth grade, the difference was not large enough to be noticed. Further breakdown of the results in fifth grade did show that illustrations helped the students that the teachers felt were the lower achievers. In Kindergarten, I had problems with getting the students to take the test properly, so I felt it was best to throw out the results.</p> <p>Conclusions/Discussion Illustrations do help children's listening comprehension. The younger the child is, the more the illustrations help with comprehension. By the time a child reaches fifth grade illustrations help only the lower achievers. I feel that this is true because by fifth grade the average student has already learned to visualize well without illustrations.</p>	
Summary Statement This project investigates whether illustrations help comprehension of stories read to grade school children.	
Help Received Brother read stories. Gateway School let me test students. Advisor helped with data reduction.	