



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> <b>Aamna J. Abbasi; Haleema F. Abbasi</b>	<b>Project Number</b> <b>S0401</b>
<b>Project Title</b> <b>Attitudes toward Organ Donor Registration in the USA: Questionnaire-Based Analysis Focused on the Muslim Sub-population</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> In the USA, there is huge demand for transplantable organs with over 110,000 people on the waiting list to receive an organ and, of these, 18 people die everyday. African-American and Asian-American communities are three times more likely to develop End Stage Renal Failure that is treated by dialysis or a kidney transplant due to high prevalence of diabetes. There is a large gap between the demand and supply of organs across the Asian community, which leads to longer waiting times for a transplant. In the USA, there are few studies that have explored the religious attitudes of ethnic minorities. To contribute toward the gap in the literature in religious attitudes toward organ donation in the USA, the links between religion and ethnicity with regards to organ donation were explored through this study.</p> <p><b>Methods/Materials</b> A questionnaire was developed with two focal areas; the first captured data of demographics such as ethnicity and religion and the second asked respondents reasons for and against registering on the organ donor register, methods to increase awareness and whether further information would encourage registration. The questionnaire was set up as a public-access Google Doc. The strategy used was convenience sampling, and snowballing technique was applied.</p> <p><b>Results</b> The majority of Muslim respondents (90%) were non-donors due to lack of knowledge of their religion's stance toward donation, not previously considering donation and not knowing what effect transplantation would have on the body and burial. Across respondents, it was agreed more information about donation is needed to encourage organ donor registrations and current donors had been encouraged by knowledge of organ donor processes and awareness of the critical shortage of donors.</p> <p><b>Conclusions/Discussion</b> The most common reasons for not being an organ donor were being unaware of religion's stance on organ donation and transplantation and never considering becoming an organ donor. Future studies will include the effectiveness of targeted intervention campaigns within the Muslim community. The interventions will be implemented, and over the long-term, the community will be re-surveyed to determine the changes in attitude towards organ donation registration.</p>	
<b>Summary Statement</b> A Questionnaire-Based Analysis Focused on the Attitudes Towards Organ Donation	
<b>Help Received</b> Thanks to Dr. Randhawa & Ms. Sharp of the University of Bedfordshire for their guidance, Dr. Tasnif of University of Texas Pan Am for his support & Dr. Yu of UCI for assistance with statistics.	



**CALIFORNIA STATE SCIENCE FAIR  
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<b>Name(s)</b> <b>Austin J. Albaugh</b>	<b>Project Number</b> <b>S0402</b>
<b>Project Title</b> <b>Grass Fed vs. Grain Fed Beef</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my project was to see if people prefer grass fed beef over grain fed beef. I live on a ranch and we raise and show both types of beef. Grain fed beef tends to have more fat content than grass fed beef. I personally believe that grass fed beef tastes better, so I wanted to see if other people felt the same way. I hypothesized that the majority of people preferred grass fed to grain fed beef.</p> <p><b>Methods/Materials</b> In my experiment, I conducted a survey. I took both types of meat and seasoned, cooked, sliced and served two identical cuts of organic meat. The manipulation was that platter A was grass fed, and platter B was grass fed. 63 people at my high school tasted a slice of meat from each platter, then wrote down on a ballot which type of meat they preferred.</p> <p><b>Results</b> More people liked the grain fed beef more than the grass fed, contrary to my hypothesis. Out of the 63 people only 20 of them preferred the grass fed beef. 43 people (68%) claimed to prefer the grain fed beef.</p> <p><b>Conclusions/Discussion</b> Because people are used to eating grain fed beef, they automatically preferred the recognizable taste. Most people buy meat in stores, and grain fed is much more common and cheaper. The grain fed beef also has more flavor because it has more fat content. However, grass fed beef is better for your health because it is leaner. Grass fed beef can also help the world because it is more efficient in terms of calorie consumption. People can get more calorie content out of eating the grain itself, rather than eating the cow that ate the grain.</p>	
<b>Summary Statement</b> My project tests to see if grain or grass fed beefs is preferred in a blind taste test.	
<b>Help Received</b> Teacher guided project in class. Mother helped decorate board. Family Friend helped me research. Father cooked the beef and prepared for serving. Resource Teacher helped organize report.	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Noorhan Z. Amani</b>	<b>Project Number</b> <b>S0403</b>
<b>Project Title</b> <b>Learn to See: A Study of Visual Perception</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Visual perception is a very important skill. It is especially crucial for school-aged children as it is needed to understand and decipher things, learn reading skills, copy text accurately, develop visual memory of things observed, develop hand-eye coordination, and to use vision with other senses to recognize different sounds. The purpose of this project was to see if training and practice could improve students' visual perception, whether this improvement was sustainable and how it effected students reading skill.</p> <p><b>Methods/Materials</b> To meet the objective of the study, informed consent was obtained from 40 participating students. First the Motor Free Visual Perception Test 3 (MVPT-3) was administered to assess the students# baseline visual perceptual status. The participants were then randomly divided into two groups: the experimental group and the control group.Students from the experimental group practiced visual perceptual skills such as visual discrimination, visual memory, figure ground, visual closure, visual form constancy, saccades, and tracking and focusing skills. Both groups were allowed to play the SET card game. After four weeks, 2nd MVPT-3 test was administered to assess the visual perceptual scores of both groups. Without any further training or practice, 3rd MVPT-3 test was administered again after an additional four weeks. Both groups# MVPT-3 scores before and after the visual perceptual skills training and practice were compared.</p> <p><b>Results</b> Results demonstrated a significant improvement in the visual perceptual test scores of students in the experimental group (with a p-value 0.00001, t stat. 7.13, 95% CI 7.66-14.04,df 19)who received training and practice on specific visual perceptual skills. In addition, both groups showed that the achieved improvement in visual perception could last for at least four weeks without any further practice. Comparison of the reading comprehension scores of both groups showed that experimental group made significant improvement(p- value .02,t stat2.57, 95% CI 4.6-19.07)in their reading scores when compared to the control group.</p> <p><b>Conclusions/Discussion</b> Findings from the study indicate that visual perceptual skills, a very important learning aide for school children, can be enhanced with proper training and practice and that this improvement is retainable.Improved visual processing skills can eventually help students to excel in their academics.</p>	
<b>Summary Statement</b> Visual perceptual skills can be enhanced with proper training and practice and this achievement can be maintained.	
<b>Help Received</b> Science teacher and mother.	



**CALIFORNIA STATE SCIENCE FAIR  
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<b>Name(s)</b> <b>Shreya Banerjee</b>	<b>Project Number</b> <b>S0404</b>
<b>Project Title</b> <b>Analysis of Correlation between Roles and Self-Esteem</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of my project was to determine if an increase in roles is the reason for an increase in self-esteem in the transition from teenage to adult. To analyze this, first I needed to determine whether adults had higher self-esteem and roles than teenagers and also look at the correlation between the number of roles a person sees himself or herself in and their self-esteem for teenagers and adults. <b>Methods/Materials</b> I distributed a survey to 20 adults and 21 teenagers. This survey consisted of a short explanation of what a role is, and asked them to list the roles, as well as having Rosenberg's self-esteem scale. The mean number of roles and self-esteem was found for teenagers and adults. The results were analyzed using a t test for two means to determine if self-esteem and roles were significantly lower in teens than adults. The correlation between roles and self-esteem was analyzed. <b>Results</b> Teenagers had significantly lower self-esteem and number of roles than adults, but the correlation between self-esteem and roles in both adults and teenagers was minimal. <b>Conclusions/Discussion</b> This implies that the increase in self-esteem is not due to the increase in the number of roles. There was a negligible correlation between roles and self-esteem in adults, implying that the number of roles is not important, but the importance of each role is more significant.	
<b>Summary Statement</b> This project was meant to determine whether there is a correlation between number of roles and self-esteem in adults and teenagers.	
<b>Help Received</b> Mother and sister helped arrange board.	



**CALIFORNIA STATE SCIENCE FAIR  
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<b>Name(s)</b> Angela G. Du	<b>Project Number</b> <b>S0405</b>
<b>Project Title</b> <b>The Effects of Digital Based Learning and Traditional Based Learning on Reading Interpretation</b>	
<b>Abstract</b> <b>Objectives/Goals</b> This experiment is designed to investigate the effects of a digitally based learning environment and a traditional based learning environment on reading interpretation using an ACT# Prose Fiction reading test. <b>Methods/Materials</b> The traditional (n=15) and digital (n=9) groups consisted of 24 predominantly Caucasian, native English speaking, high school students between the ages of 16-18, currently enrolled in a college preparatory psychology class. Students attend either a digital or traditional school and both are from a rural mountain area in Central California. Participants were obtained as part of a purposive sample because of certain characteristics that were required between the control and experimental group participants. In the first test, a traditional (paper) version was administered to the students in a traditionally based learning environment. In the second test, an online version was presented to the students enrolled in a digitally based learning environment. The independent variable was the digital or traditional learning environment, and the dependent variable was the score received on the reading tests. <b>Results</b> A one tailed t-test demonstrated that there was a significant difference at the $p < 0.005$ level, which shows traditional based learning has a positive impact on ACT# Prose Fiction reading test scores. <b>Conclusions/Discussion</b> In conclusion, the data collected resulted in supporting the research hypothesis. Therefore, an individual studying at a traditional based learning school is more likely to score higher on a reading interpretation test than an individual studying at a digital based learning school.	
<b>Summary Statement</b> This experiment is designed to investigate the effects of a digitally based learning environment and a traditional based learning environment on reading interpretation using an ACT# Prose Fiction reading test.	
<b>Help Received</b> Received help in learning how to use/operate Photoshop for the production of the poster board, and IB instructor help	



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<b>Name(s)</b> <b>Sruthi Durai; Ruiwen Shen</b>	<b>Project Number</b> <b>S0406</b>
<b>Project Title</b> <b>Effects of Exercise on Human Circadian Rhythm and Biological Clock</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The most important thing to a teenager is sleep. We want to get as much of it as possible. On school nights, we are frequently up past midnight with schoolwork, sports and extra-curriculars. On weekends, we would like to rise past noon, but some of us seem to possess a biological clock that wakes us up at around the exact same time every day. This project looks at how many people have biological clocks and whether exercise affects their biological clock and sleep cycle.</p> <p><b>Methods/Materials</b> To gain this information, we had teenage participants record the time they slept, the time they woke, the days they used an alarm clock (if at all), and the amount of weekly exercise they did over the period of 31 days, January 1st to 31th.</p> <p><b>Results</b> At the end of the month, we collected this data and determined that sophomores who exercised 4-7 hours a week possessed more constant sleep cycles than those who did exercised more or less. However, the presence of a biological clock was seemingly random among the participants and exhibited no correlation to the amount of exercise one gets.</p> <p><b>Conclusions/Discussion</b> After completing this experiment we concluded that increasing the amount of weekly exercise does not necessarily make one's sleep cycle more constant. Rather, exercising between the interval of 4 to 7 hours per week proved to result in a more balanced schedule for the subjects of our experiment. In this way they had very stable sleep cycles over the course of the experimental month compared to those who exercised less or more. Since there was no correlation between the weekly hours of exercise and a subject's biological clock, we concluded that exercise did not show any trends for the biological clock data set.</p>	
<b>Summary Statement</b> We experimented to see if increasing amount of weekly exercise made a human's biological clock and sleep cycle more constant. .	
<b>Help Received</b> Ms. Kuei (teacher) gave us feedback. Parents provided materials such as board.	



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<b>Name(s)</b> <b>Ruwanthi N. Ekanayake</b>	<b>Project Number</b> <b>S0407</b>
<b>Project Title</b> <b>Efficacy of Perceptual Modality Test Preparation in Comparison to Universal Design for Learning</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of the current study was to investigate the effectiveness of perceptual modality based test preparation in comparison to that of Universal Design for Learning test preparation. In addition, the study tested the accuracy of students when self-identifying perceptual modality.</p> <p><b>Methods/Materials</b> Over 180 high school student subjects were tested to determine their perceptual modality and placed into one of four divisions: auditory, kinesthetic, print, or visual. Each division received a history lesson, then prepared for an exam with strategies utilizing their own perceptual modality, and was tested on this information. Each division received another history lesson and prepared with the UDL test preparation process, and was tested on this knowledge. In addition, each subject was instructed to identify his or her own perceptual modality.</p> <p><b>Results</b> Over 87% of subjects displayed higher scores with perceptual modality test preparation. The high statistical significance of these results was confirmed by the t-test, with a two-tailed P value less than 0.0001. In addition, over 56% of subjects incorrectly identified their perceptual modality. However, this was not particularly statistically significant, with a two-tailed P value of 0.8159.</p> <p><b>Conclusions/Discussion</b> These results did not support the hypothesis: contrary to the original prediction, the perceptual modality test preparation was significantly more effective and students were not considerably accurate in predicting their own perceptual modality.</p> <p>This study provides crucial information regarding effective test-taking for students: if able to identify their perceptual modality, they can contour study strategies to maximize comprehension and test performance. In addition, the study supports the idea of learning styles; thus educators can use these results to alter their teaching programs to benefit the greatest number of students. Furthermore, the study displayed that students themselves are not the best predictors of their own perceptual modality. Thus, this study provides significant information to the field of cognitive science, supporting the idea that perceptual modality plays a vital role in education and learning.</p>	
<b>Summary Statement</b> The purpose of the current study was to investigate the effectiveness of perceptual modality based test preparation in comparison to that of Universal Design for Learning test preparation & determining accuracy of student PM self diagnosis.	
<b>Help Received</b> Parents and Mr. Peter Starodub provided constant support, guidance and encouragement. Dr. Stephen Madigan, Dr. Matthew Wright, Mr. John Wheeler and Dr. Wendy Linderholm helped to refine design of experiment.	



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<b>Name(s)</b> <b>Joshua Fields; Riley Magidow; Zachary Magidow</b>	<b>Project Number</b> <b>S0408</b>
<b>Project Title</b> <b>Post High School Exposure and Its Effect on Post High School Decisions</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our objective was to determine whether high school students who are exposed to post high school options, such as college choices, are more likely to make more informed decisions about their future.</p> <p><b>Methods/Materials</b> Our materials were human subjects (Juniors and Seniors at Thousand Oaks High School) and an online survey (surveymonkey.com) The experiment was conducted via a survey. The questions on the survey ranged from topics of parent education level and GPA to visiting colleges. There is a question asking what number a student was assigned in class. This number is the determining factor between the experimental and control group. This number was randomly assigned to classes via a random number generator. After the basic data was gathered, the experimental group went on and looked at several pages of statistics and facts regarding college admittance rates, the availability of financial aid, and the effects of a degree on annual income. Then, they were asked a series of questions regarding the changes in their attitudes towards post high school options and how it might affect their decisions towards the future.</p> <p><b>Results</b> Based on results dependent on parental education level, hours of research, and college visits, more exposure to higher education options trends towards positive responses.</p> <p><b>Conclusions/Discussion</b> Our data supports our hypothesis that exposure to post high school option are more likely to make more knowledgeable choices regarding their future. In almost all instances, a person coming from a position of lesser exposure, whether it be with a parent having a lesser education level or not having a chance to visit colleges, was more affected by the statistics and information provided in the experimental portion of the survey.</p>	
<b>Summary Statement</b> The amount of exposure a student has to options for a higher education positively correlates with decisions a student makes regarding their future.	
<b>Help Received</b> None	





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<b>Name(s)</b> <b>Shybreaze Fischbach; Daisy Hincker Tye</b>	<b>Project Number</b> <b>S0409</b>
<b>Project Title</b> <b>Bully</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The reason we did this experiment is to figure out why people bully.</p> <p><b>Methods/Materials</b> The materials we needed for this experiment is; paper, pencil and 60 middle-school students. Our procedure is as follows: 1. print 60 pages of our a and b questions. 2. bring students out one at a time and ask them "do you think you're a bully?" if the answer was no we direct them to pick up one of the pages labeled "a", if the answer was yes they should pick up a page labeled "b". 3. We leave them after assuring them that this questionnaire is completely anonymous to fill it out. 4. we tally up the results and make a graph.</p> <p><b>Results</b> most students who took test A answered yes (I have) to teasing, calling mean names, yelling meanly, teasing about race/ethnicity , and punching/violence. very few said yes to jealousy. most students answering test B said yes to family issues/situation being a cause, thinking they are better than others, picking on others makes them feel better about themselves, and being paid. The majority said no to being picked on by others, jealousy, and religious beliefs. this is not what we were expecting but it is also not far from our hypothesis.</p> <p><b>Conclusions/Discussion</b> The top reasons our tests showed us they bullied was because they were "bored", because they wanted to fit in, and because they were paid. We also saw that most of the middle-schoolers who said they were not bullies found that there was far to many yeses on their sheet for that to be true.</p>	
<b>Summary Statement</b> We have obseved bullying all over the world and we thought if we could find the reason why we could explain the harmfull results and stop bullying.	
<b>Help Received</b> Erin Vaccaro helped us refine our questions and make accurate graphs	



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<b>Name(s)</b> <b>Mary A. Flemming</b>	<b>Project Number</b> <b>S0410</b>
<b>Project Title</b> <b>Does the Frequent Use of Social Media Impact the Verbal Communication Skills of Adolescents with Adults?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this study is to determine if social media and its frequent occurrence in adolescence lives impact the adolescence themselves in their ability to verbally communicate with adults such as their parents, teachers, or grandparents. My hypothesis is the frequent use of social networking sites (Twitter, Facebook, &amp; Instagram) will impact the adolescence verbal communication skills when they talk to adults.</p> <p><b>Methods/Materials</b> The main materials I used to conduct this study were a class set of iPads to take the survey, a statistical calculator to randomly assign participants from my school's junior class, and a google account to use google spreadsheets to analyze the data. I randomly assigned 160 participants but only 67 returned the consent forms and were able to take the survey. Those that returned the consent forms were excused for ten minutes from their forth period class on a friday to take the survey on the class set of iPads. The survey usually took five to ten minutes for the individual to complete before turning in the iPad and receiving a candy of their choice as a thank you.</p> <p><b>Results</b> To get a better understanding of the data, I broke down my title question into many small questions allowing me to take multiple correlation of the mean answers to two certain sets of questions in the survey. However, the majority of the correlation numbers turned out to be insignificant and did not provide us with enough evidence to reject the null hypothesis and accept the alternative(my) hypothesis. I then categorized the individuals into social "junkies", "neutral users", &amp; "non-junkies" as well as "good communicators", "neutral communicators", &amp; "poor communicators" using the answers to particular set of questions that allowed me to measure social media usage and verbal communication skills.</p> <p><b>Conclusions/Discussion</b> I took the correlation of the numbers of teens in each of the categories to determine an overall answer. The number was not significant enough to reject the null hypothesis and accept my hypothesis. This study and sample conclude that there is no relationship between the use of social media and communication skills in teens when talking to adults. Instead, these results suggest that possibly it is the adults that blame the innovation of technology and social media as a buffer for their mistake of not teaching the younger generation the proper verbal communication skills they expect them to have.</p>	
<b>Summary Statement</b> Determining the effect of frequent use of social media with verbal communication skills of adolescence when talking to adults.	
<b>Help Received</b> stats teacher showed me the best way to analyze data; science teacher showed me how to use google docs to analyze data; my high school for allowing me to use the class set of iPads	



**CALIFORNIA STATE SCIENCE FAIR  
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<b>Name(s)</b> <b>Christian Garcia; Kellen Gerig; Rhett Rhodes</b>	<b>Project Number</b> <b>S0411</b>
<b>Project Title</b> <b>Video Games: The Next Sport Performance Enhancing Drug?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Our science project investigates the effects of video games on athletic ability, specifically hand-eye coordination. We don't predict that video games have an impact on natural athletic ability, but we do hypothesize that playing video games will have a positive impact on hand-eye coordination. We chose baseball as the sport to test because it requires much hand-eye coordination. <b>Methods/Materials</b> Our experiment involved a pre-test and post-test to calculate our hand-eye coordination before and after the manipulation. We tested two group members, one representing a naturally athletic person (A) and the other representing an athlete with less talent for baseball batting (B). Subject A is not a "video gamer", whereas Subject B can be classified as a "video gamer". Each batter received twenty pitches from a live pitcher per treatment. About fifteen hours elapsed between treatments. We played Wii Sports Baseball as our video game for roughly ten minutes right before the second treatment. <b>Results</b> In the pre-test, Subject A hit fifteen out of twenty pitches and Subject B hit thirteen out of twenty. During the manipulation, Subject A beat B 5-0 both times. In the post-test both batters showed improved scores. Subject A improved to seventeen out of twenty, and Subject B increased to fourteen out of twenty. <b>Conclusions/Discussion</b> We were able to conclude that our hypothesis was correct; video games do positively affect human motor skills, but not significantly. Playing video games does not affect athletic ability, but it does slightly improve hand-eye coordination. This is important in the world today because lack of physical activity is a growing epidemic. More and more youth in America are giving up sports and outdoor activities to be inside. This study proves that video games do not take the place of the physical play recommended by doctors for proper health.	
<b>Summary Statement</b> This project explores how relationship between video games and hand-eye coordination in sport.	
<b>Help Received</b> Teacher helped guide project and gramatically revise. Baseball teammate pitched for pre/post-test.	



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> <b>Alejandro G. Gonzalez</b>	<b>Project Number</b> <b>S0412</b>
<b>Project Title</b> <b>Finding a Relationship between Toys and STEM Careers</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To determine if there is a relationship between childhood toys and STEM careers. Studies have shown that there is a very low percentage of our youth pursuing a STEM careers. Could childhood toys influence a child into a STEM career?</p> <p><b>Methods/Materials</b> I will develop and administer a survey to adults. Surveys will be separated into 2 groups, STEM and Non-STEM surveys. Participants will be identified as having a STEM career if they attended college, completed a year of a college science class, and completed a year of a college calculus class. In the survey these adults will be asked to rank the category of toy they played with most frequently. The categories of toys are: building toys; collaborative toys; comfort toys; performance vehicle toys; role-play toys; skill toys; and strategic toys. My hypothesis is that adults in STEM careers will chose the category of building toys as the toys they played with most frequently during their childhood.</p> <p><b>Results</b> Looking at the quantitative data the toy category #building toys# was selected more often than the other categories of toys by adults in STEM careers. After surveying 628 adults, 317 of those adults were identified as having a STEM career. Of these 317 STEM participants 35% selected building toys as the category of toy they played with most frequently in their childhood. The percentages for the other categories were as follows: 22% collaborative toys; 2% comfort toys; 10% performance vehicle toys; 16% role-play toys; 8% skill toys; and 6% strategic toys. Using the one proportion z-test, the data shows that building toys will have a p-value of 0.9999 which has a z-value of -5.223. This shows that the probability of there being a relationship between STEM careers and building toys alone is unlikely.</p> <p><b>Conclusions/Discussion</b> My hypothesis is partially incorrect. The qualitative data shows that there are three toy categories that show a relationship with STEM careers. These toy categories are: building toys; collaborative toys; and performance vehicle toys. If these three toy categories are combined then the quantitative data of these three toy categories shows a definite relationship between STEM careers and toys. These three categories of toys will have a p-value of <math>1.105 \times 10^{-10}</math> which has a z-value of 6.347. Parents and educators should encourage building toys, collaboration toys, and performance vehicle toys to help foster a STEM career.</p>	
<b>Summary Statement</b> To determine if there is a relationship between childhood toys and STEM careers.	
<b>Help Received</b> Dr. McGregor and Dr. Simani looked over the surveys before I distributed them. Mr. Ortiz, a statistics teacher at my school, helped me apply and understand the statistics used in my project.	



**CALIFORNIA STATE SCIENCE FAIR  
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<b>Name(s)</b> Zhaohong Jin; Wei Zhou	<b>Project Number</b> <b>S0413</b>
<b>Project Title</b> <b>Nash Equilibrium: Human Behaviors in Real Life Economics Games</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this science project is to discover if the theoretic prediction of the outcomes by using Nash Equilibrium in economic games is valid and accurate in real life cases; if not, what is the Nash Equilibrium in real life.</p> <p><b>Methods/Materials</b> The experiment includes 58 people. They will be paired up and play an economic game and try to win some money from a pool with 16000 dollars. Each person can either choose to play <math>\text{friend}_{i\pm}</math> or <math>\text{foe}_{i\pm}</math>. If one person chooses <math>\text{Friend}_{i\pm}</math> and another choose <math>\text{foe}_{i\pm}</math> the one chooses <math>\text{foe}_{i\pm}</math> get 16000 dollars. If they both choose <math>\text{friend}_{i\pm}</math> they each gets 8000. If both choose <math>\text{foe}_{i\pm}</math> they get nothing. In the first try, each person is going to choose an action without communication. In the second try they are going to repeat the game, but this time, they are allowed to communicate with each other. In the third try, we are going to explain to them the concept of Nash Equilibrium; they will repeat the game with the knowledge of Nash Equilibrium. In the Forth Try, they will repeat the game again with communication.</p> <p><b>Results</b> The result of the game shows that people reach a different equilibrium from the theoretic prediction, and it supports the hypothesis that the theoretic prediction of the outcomes is not accurate in real life applications. Based on our result, senior students in BCHS have an approximately 50% chance of choosing <math>\text{friend}_{i\pm}</math> and 50% chance of choosing <math>\text{foe}_{i\pm}</math>.</p> <p><b>Conclusions/Discussion</b> This project shows that human emotions, the incomplete information, and distrustful of others can greatly affect people's choices in economic games. So when in the real world of business, it is very important to use the legal methods like signing contracts to ensure a win-win situation. We will extend our experiment objects to people in different fields and further discover people's thinking process in economics games. Our ideas are very useful in fields like politics, business, and psychology.</p>	
<b>Summary Statement</b> To research and find the real life equilibrium in economics games	
<b>Help Received</b> None	



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<b>Name(s)</b> Cassandra Jones; Savanna Miller	<b>Project Number</b> <b>S0414</b>
<b>Project Title</b> Soda Taste Test	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> We wanted to see if people in our community (mostly school students) can taste the difference between Coca-Cola/Pepsi and Diet-Coke/Diet-Pepsi.</p> <p><b>Methods/Materials</b> 100 small disposable cups, 2 liters of each of the following: Coca-Cola, Pepsi, Diet-Pepsi, and Diet-Coke. Cleaning supplies (for mess), a carrying tray, a small box with a hole cut on top, 100 survey tickets, computer, and the student body.</p> <p><b>Results</b> Most people were telling each other the answers and our workers had accidentally poured the wrong sodas in the corresponding cups, creating us to change them to the correct sodas, leaving a different taste to a few cups. Our test had shown bad results, leading to the answer of no you cannot taste the difference between these four sodas, especially without knowing the labels of each.</p> <p><b>Conclusions/Discussion</b> Our hypothesis was incorrect because many people could not taste the difference between the four sodas. This was because many people have watched commercials that changed their point-of-view and students were telling others the incorrect answers, also changing their view.</p>	
<b>Summary Statement</b> If you can taste the difference between Coca-Cola/Pepsi and Diet-Coke/Diet Pepsi	
<b>Help Received</b> Miss Lewis and Michael helped pour and give out sodas	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Satya S. Karri	<b>Project Number</b> <b>S0415</b>
<b>Project Title</b> <b>Can People Identify Numbers Greater than Three?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The goal is to determine if people can actually estimate and identify numbers greater than 3. According to a study done in Nicaragua, people can determine numbers up to 3, but they have difficulty when presented with numbers greater than 3. I hypothesized that humans could only accurately determine numbers up to 3.</p> <p><b>Methods/Materials</b> Prior to actual testing, the subject had to pass two control tests. The first test had the subject read some words on the screen; this was used to determine if the subject could distinguish black from white. The second test had the subject count to 15; this was used to determine the subject's knowledge of numbers up to 15. Then, I used a PowerPoint presentation to present the set quantities of objects, which were simply dots on a screen. The dots flashed on the screen for exactly 0.5 seconds by applying a timer on the appropriate slides. There were 15 slides of dots total and the order was determined using a random number generator. Each correct answer was recorded as well as each incorrect answer. I tested 3 age groups: less than thirteen-years-old, thirteen to twenty-one-years-old, and greater than twenty-one-years-old.</p> <p><b>Results</b> All subjects could correctly estimate numbers up to 4 dots. Subjects then began to make a few mistakes at 5 dots. Once there were 9 dots, however, there was a massive drop in correct answers. Past 9 dots, there continued to be a lack of correct answers. Subjects less than thirteen-years-old were made mistakes than those who were older.</p> <p><b>Conclusions/Discussion</b> Since all subjects correctly estimated the number of dots up to 4, people must be able to identify numbers up to 4. Since a few incorrect answers were given, starting at 5 dots, it is reasonable to say that humans still have a good grasp on this set of numbers. However, at 9 dots and onward, most people have difficulty with estimation. Therefore, my hypothesis was slightly incorrect; humans can identify numbers greater than 3.</p>	
<b>Summary Statement</b> I tested to see how accurately a person could estimate a quantities greater than 3.	
<b>Help Received</b> I received help from Dr. Joseph Immel, who helped me choose an idea and procedure. I also received help from Eddie Ortiz. He helped me conduct some tests; he helped me transition through the PowerPoint so that I could test with greater efficiency.	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Tess G. Levinson</b>	<b>Project Number</b> <b>S0416</b>
<b>Project Title</b> <b>The Impact of Emotion on Memory</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Arousal-biased competition theory states that emotional arousal has an enhancing effect on memory for high priority information. However, there is a lack of understanding on how emotional arousal affects various processes of memory differentially. Pattern separation is a process of memory that allows people to identify similar information as similar, but not the same. Previous research has suggested that emotional arousal enhances pattern separation abilities, but there has been no indication as to whether that interaction occurs during encoding or retrieval. Here, we examined the differential effects of emotional arousal at encoding and at retrieval on pattern separation abilities. <b>Methods/Materials</b> Healthy younger adults viewed paired slideshows of images. The first slideshow required them to identify images as belonging indoors or outdoors and served as the encoding procedure. The second slideshow required them to identify images as either "new," "similar," or "same." Emotionally arousing images were added to either the encoding slideshow, the retrieval slideshow, or neither. <b>Results</b> Accuracy in identifying similar images increased for blocks that included emotional arousal at encoding compared to blocks that did not include emotional arousal. However, misidentification of similar images decreased in blocks that included emotional arousal at retrieval compared to blocks that did not include emotional arousal. <b>Conclusions/Discussion</b> Emotional arousal differentially influenced the encoding and retrieval processes.	
<b>Summary Statement</b> This study aimed to establish the timeframe at which emotional arousal impacts the pattern separation process for high priority information.	
<b>Help Received</b> Worked in Dr. Mara Mather's Emotion and Cognition Lab at the University of Southern California under Allison Ponzio, Doctoral Candidate	





# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> Anna J. Lou	<b>Project Number</b> <b>S0417</b>
<b>Project Title</b> <b>An Artificial Intelligence Enhanced Teaching Model that Significantly Improves Effectiveness and Efficiency in Science</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The United States is ranked 21st in science among the 34 OECD countries on PISA 2012. Researchers state that any reform of science education must take place "in the classroom." My objectives were to (a) develop an innovative artificial intelligence (AI) enhanced teaching model, (b) compare its effectiveness and efficiency with traditional, direct instruction (DI) at both college and high school levels, and (c) optimize the new teaching model by testing whether variables such as sound and grouping matter.</p> <p><b>Methods/Materials</b> My teaching model applied the cognitive load theories and combined expertise in areas of education, AI architecture, and science. I created an AI computer program as a pedagogical agent to implement research in guided student-centered learning that embedded 73 checkpoints for individualized guidance. In Exp. 1 (N=43, college) and Exp. 2 (N=107, high school), subjects were randomly assigned to the AI or DI group and took pretest and posttest before and after the instruction time. In Exp. 3, another 114 students were tested to determine the best AI condition among: (a) sound-individual (one student per computer), (b) sound-paired (2 per computer), (c) no sound-individual, and (d) no sound-paired.</p> <p><b>Results</b> T-tests detected a significant difference in effectiveness (factual, conceptual, and procedural knowledge gains) between AI and DI in both college (<math>p=0.00</math>, <math>d=1.43</math>) and high school (<math>p=0.00</math>, <math>d=1.53</math>), as well as in efficiency (high performance with low mental effort). The <math>d</math> values (<math>&gt;0.80</math>) indicated remarkably large effect sizes. AI increased knowledge gains by 122% in college and 78% in HS. One-way ANOVA and Post Hoc found no significant differences among the 4 AI conditions (Exp. 3). A further two-way ANOVA found neither main effect nor interaction effect between sound and grouping, suggesting that my AI-enhanced teaching model can be implemented with much flexibility to achieve similar learning gains.</p> <p><b>Conclusions/Discussion</b> My project is significant because it (1) answered the call of the US Department of Education in translating many research recommendations into practice in science classrooms, (2) developed an AI-enhanced teaching model that significantly improved the effectiveness and efficiency of guided student-centered learning, which can potentially have a global impact on students, and (3) demonstrated the flexible implementation of the teaching model, adapting to individual preferences of teachers and students.</p>	
<b>Summary Statement</b> I developed an AI-enhanced teaching model that significantly increased instructional effectiveness and efficiency in science, replicated results in both college and high school, and demonstrated its flexible implementation.	
<b>Help Received</b> I received advice on research directions, experimental design, and data analysis from professors in education, math, and chemistry. My high school chemistry teacher and four college professors provided subjects for Experiments 1-3.	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Yelena Mandelshtam</b>	<b>Project Number</b> <b>S0418</b>
<b>Project Title</b> <b>When Learners Surpass Their Models: Mathematical Modeling of Learning from an Inconsistent Source</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This project is a second-year study, in which I worked on developing and studying an algorithm to model successful learning from an inconsistent source. It has been reported in the literature that both adults and children can, to a different degree, modify and regularize the often inconsistent linguistic input they receive. Their regularization has been attributed to an innate sense of grammar, also known as universal grammar (UG). We aim to demonstrate that the observed regularization does not require such innate abilities. We present an algorithm to model and investigate the learning process of a learner mastering a set of (grammatical or syntactic) forms from an inconsistent source without possessing any innate biases about the language.</p> <p><b>Methods/Materials</b> I conducted a thorough analytical study of the algorithm using the apparatus of Markov Chains and also a numerical study by writing several computer codes in Fortran. The results from my study were then compared to the data collected by E. Newport and J. Singleton.</p> <p><b>Results</b> We show, both rigorously by proving two theorems about the algorithm, and numerically, that the algorithm possesses a frequency-boosting property, whereby the frequency of the most common form of the source is increased by the learner. Furthermore, I found several patterns showing the relationship of speed and quality of learning with various parameters</p> <p><b>Conclusions/Discussion</b> We show that the algorithm possesses a frequency-boosting property, whereby the frequency of the most common form of the source is increased by the learner. We also explain several key findings of the Newport-Singleton experimental study. Ultimately, we show that it is possible for a learner to achieve results similar to those in the observational/experimental data without the learner having any innate biases or constraints about the patterns that exist in the language.</p>	
<b>Summary Statement</b> I developed and analyzed a mathematical model which shows that a learner can successfully learn from and surpass its inconsistent sources without any innate sense of grammar.	
<b>Help Received</b> Prof. N. Komarova (UCI) provided supervision and conceptual guidance at several stages of my work. However, all my research and report were done solely by me.	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jennifer L. McDonnal</b>	<b>Project Number</b> <b>S0419</b>
<b>Project Title</b> <b>Testing Teaching Styles</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This project attempted to find a thorough and efficient method for teaching writing.</p> <p><b>Methods/Materials</b> To perform this experiment, 572 middle school students (22 classrooms) were divided into 3 groups by classroom (lecture, collaboration, and control), each of which were exposed to either 10 minutes of a specific teaching style or no teaching style (control). The lecture group was presented with a lecture on how to write and organize a research paper, and the collaboration group divided into teams to complete an activity on the same topic (Appendix 1). Then each student (including the control group) was given a test to gauge their knowledge of the topic (Appendix 2), and the scores of these tests were compared.</p> <p><b>Results</b> Average Percent Correct by Teaching Style: Control -- 53.25% Collaboration -- 60.26% Lecture -- 58.50%</p> <p><b>Conclusions/Discussion</b> The difference between the average scores for the lecture group and the collaboration group are not statistically significant and therefore do not support the hypothesis.</p>	
<b>Summary Statement</b> This project attempted to find a thorough and efficient method for making sure students master their basic writing skills through an exploration of two different teaching styles: collaboration and lecture.	
<b>Help Received</b> None	



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> <b>Sathvik Nair; Anirvin Sikha</b>	<b>Project Number</b> <b>S0420</b>
<b>Project Title</b> <b>Telling the Difference: How the Placebo Effect Changes Perception of Organic and Nonorganic Food</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> With increasing demand for organic food, we sought to determine if human senses are capable of distinguishing organic from nonorganic food. Based on background research, we hypothesized that when subjects were given nonlabeled foods, they would be unable to tell the difference. Similarly, if we mislabeled food as organic, then we hypothesized they would find it would taste better.</p> <p><b>Methods/Materials</b> Our experiment had two phases: Phase 1, a blind test and Phase 2, a placebo effect test. Consent was obtained from 40 human subjects, who agreed to eat apples, bread, carrots, cheese, and yogurt. In Phase I, subjects ate organic and nonorganic variants of the foods and were asked which they believed to be organic. Phase II consisted of subjects being placed into groups. Group 1 was given organic food, Group 2 was given organic food that was mislabeled as nonorganic, Group 3 was given nonorganic food, and Group 4 was given nonorganic food mislabeled as organic. Subjects rated the food's taste on a scale of 1-5.</p> <p><b>Results</b> In the blind test, only 45.4% of subjects correctly identified the organic food, even though 67.5% of subjects preferred organic food. Subjects were thus unable to determine the identity of the food through taste alone. In the placebo effect test, Group 1's average rating on a scale of 1-5 was 3.5, Group 2's was 3.1, Group 3's was 3.0, and Group 4's was 3.4. Group 4, which was told that nonorganic food was organic, had data with standard deviation of 0.11, 0.38 lower than that of the next lowest group. As the average rating for each food was consistent with the overall average, we proved our hypothesis about improved perception.</p> <p><b>Conclusions/Discussion</b> Subjects were unable to reliably distinguish organic from nonorganic foods when they were not labeled. However, labeling a food as organic yielded improved taste perception, regardless of its true identity. It can be seen how the placebo effect, traditionally used in medicine, can be extended to the field of marketing. Organic food sales for 2012 were worth \$28 billion, organic food typically costs double the amount of nonorganic food, and there is no scientific test to determine if a food is organic. Since there is a financial incentive to mislabel food as organic, it is important to develop a test to determine if a food is truly organic.</p>	
<b>Summary Statement</b> First, we administered a blind test to determine if subjects could distinguish organic from nonorganic food, and then we used the placebo effect to assess if subjects' taste perception of food could be changed through mislabeling.	
<b>Help Received</b> Test subjects participated in experiment; parents helped purchase food; teacher helped improve presentation.	



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> <b>Roshini N. Ravi</b>	<b>Project Number</b> <b>S0421</b>
<b>Project Title</b> <b>The Might of Mindset: A Study on Growth vs. Fixed Mindsets</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose was to determine whether there was a correlation between academic success and happiness levels among high school students who are fixed minded (i.e. they believe that basic abilities such as their intelligence are fixed) and those who are growth minded (i.e. they believe that with dedication and effort their basic qualities can be developed).</p> <p><b>Methods/Materials</b> HP Math Analysis students were offered two short and confidential questionnaires. Questionnaire I, a survey based on the Oxford Happiness Questionnaire was to determine the individual's overall happiness level. Questionnaire II, a survey based on Professor Carol Dweck's work, was to determine the individual's mindset type. Both surveys consisted of 20 statements and subjects were asked to rate their level of agreement on a 1-4 scale (1: strongly disagree; 2: disagree; 3: agree; 4: strongly agree). Subjects were also asked for their age, gender, grade, GPA and Subject Number, which was assigned prior to the study.</p> <p><b>Results</b> Based on the linear regression t-tests conducted on the data, there was a significant positive correlation between mindset score and happiness score as well as mindset score and GPA. That is, as mindset score increased, both GPA and happiness score increased. The composite mean happiness score of those who were growth minded was significantly higher than those who were fixed minded (<math>t = -3.24</math>, <math>df = 10.4</math>, <math>p = 0.0085</math>). Beyond happiness, the average GPA of growth minded individuals was also significantly higher than fixed minded individuals (<math>t = 3.94</math>, <math>df = 11.06</math>, <math>p = 0.0023</math>). Robustness tests conducted on the results verified the accuracy of the values. These results were confirmed when each gender was examined separately.</p> <p><b>Conclusions/Discussion</b> The significance tests conducted exhibit a clear positive correlation between mindset score, happiness score and academic success. The next step would be to first determine the ease with which the growth mindset can be taught and to then develop an effective method to implement the basics of the growth mindset into our own educational system.</p>	
<b>Summary Statement</b> The project is an examination of mindset type, happiness level and academic success to determine whether there is a correlation between the variables.	
<b>Help Received</b> Parents helped acquire materials. Mrs. Lisa Layshot permitted the study to be conducted during class.	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Pravin Ravishanker</b>	<b>Project Number</b> <b>S0422</b>
<b>Project Title</b> <b>Genetics or Gender? Effect of APOE-e4 and Gender on Age-Related Brain Atrophy and Cognitive Decline in Alzheimer's</b>	
<p align="center"><b>Abstract</b></p> <p><b>Objectives/Goals</b>  2/3 of the 5 million Alzheimer's disease (AD) cases over age 65 in the U.S. are women. Using linear mixed effects regression (LMER), this project investigated the role of gender, age, and APOE-e4 allele (major genetic risk factor) in cognitive/structural decline over time. I hypothesized that gender and APOE-e4 had similar and significant effect sizes on AD progression with interactions between risk factors also being significant.</p> <p><b>Methods/Materials</b>  I obtained approval to access Alzheimer's Disease Neuroimaging Initiative (ADNI), a global effort tracking clinical/imaging AD biomarkers. Using "open-source R project" for statistical computing, I examined over 24000 observations of 818 patients over 5 year longitudinal study across 3 cohorts (Healthy Controls (HC), Mild Cognitive Impairment (MCI), AD) with 168 LMER model-runs to understand effects of the risk factors (Phase1) and their interactions (Phase2). 3 psychometric tests (ADAS-Cog, CDR-SB, MMSE) and 4 structural volumes from UCSD MRI data (whole brain, hippocampus, entorhinal cortex, middle temporal) were examined. This study employed weight of evidence and AIC (Akaike's Information Criterion), a maximum likelihood based multimodel inference to examine relative plausibility of statistical models.</p> <p><b>Results</b>  Phase1: For HC cohorts, gender had significant effect on rates of cognitive and structural decline in ADAS-Cog and all structural regions. While gender impacted rate of cognitive decline in MCI cohorts, APOE-e4 had the highest effect on rate of structural decline. For AD cohorts, gender had higher effect size than APOE-e4 for all analyses.  Phase2: For HC cohorts, APOE-e4*age interaction impacted all brain regions and cognitive scores. In MCI, gender*age in Entorhinal Cortex and whole brain volume was found to be significant. While gender*age was significant for AD cohorts in Hippocampus, Entorhinal Cortex, and Mid-Temporal volumes, age*gender*APOE-e4 was significant for cognitive ADAS and CDR scores.</p> <p><b>Conclusions/Discussion</b>  With 95% confidence, I conclude that gender considerably affects cognitive and structural rates of decline in AD, having an effect size equal to or greater than APOE-e4. Interactions between age, APOE-e4, and gender play a major role in AD progression. Since women have higher rates of cognitive/structural decline than men, this study underscores the importance of female inclusive/targeted clinical trials to fight against Alzheimer's.</p>	
<b>Summary Statement</b> This study assesses the impact of gender and its interactions with age and genetics on AD trajectory and deduces that female gender is equally or more important than genetic risk factor and needs to be accounted for in early AD diagnostics.	
<b>Help Received</b> My grandma for motivation; my family and teacher Mr. Wong for encouragement; my mom, Shanthi Pichai, for mentoring; and ADNI for valuable data.	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Matthew P. Saenz</b>	<b>Project Number</b> <b>S0423</b>
<b>Project Title</b> <b>Diabetes Won't Keep Me Down: Can Modern Technology Improve Diabetic Control?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Type-2 Diabetes is a prevalent issue in today's society. Recent estimates have placed 25.8 million people -- in the U.S. alone with this condition, and a further 70.9 million as "pre-diabetic." Diabetes is measured by taking the hemoglobin A1C percentages, which measures the amount of glucose attached to a hemoglobin molecule. The objective was to determine the effectiveness of an informative website on improving the diabetic control in patients. It is hypothesized that this form of access will improve diabetic control.</p> <p><b>Methods/Materials</b> 21 subjects (10 male 11 female), based on the time of their last HA1C test (at least 2 months prior) and diabetic control, were asked and selected to be a part of the study by their doctor. All personal information (except gender, age and HA1C level) was withheld. Upon agreement, verbal and written instructions on how to view the website, along with a signature of consent form were given. For 1 month, the website was updated three times a week, and the subjects were asked to visit the site at least once a week. This website showcased facts about their condition and diet and exercise regimens. After the month, the subjects notified their doctor on the number of times the website was viewed, and their blood was retested. A survey was also collected on the subjects' opinions on the website. The old and new HA1C tests were analyzed, and the percent change was compared with other subjects.</p> <p><b>Results</b> 21 subjects completed the study. 18 out of 21 subjects reported improvement in their HA1C levels. Overall, the average HA1C level decreased after viewing the website (7.38 to 7.13). The average percent change was a decrease of 4.25% (based off the original A1C level). Upon further analysis, a positive correlation between the number of times subjects viewed the website, and greater percent change in HA1C was found. In addition, male subjects had a higher average percent decrease compared to females, and subjects aged 56 and older had a higher average percent change compared to those 55 and younger.</p> <p><b>Conclusions/Discussion</b> The hypothesis was supported. Nearly 86 percent of subjects with a long history of poor diabetic control improved, which is highly encouraging. In the future, more subjects over a longer period of time would be used. Optimally, a partnership with the local hospital in developing an education plan using websites would be established.</p>	
<b>Summary Statement</b> This project determined the effectiveness of modern technology (an informative website) on the diabetic control of patients with poorly-controlled diabetes.	
<b>Help Received</b> Dr. Chae recruited subjects; Father helped construct board	



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> <b>Gaia Saetermoe-Howard</b>	<b>Project Number</b> <b>S0424</b>
<b>Project Title</b> <b>Investigating the Patterns of Cross-Modal Perception in Converging Styles of Music</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this research was to understand the patterns among cross-modal perceptions of music, that is, how people from different intellectual, artistic, and socioeconomic backgrounds interpret music.</p> <p><b>Methods/Materials</b> To observe these patterns, the articulation of the same musical phrase with a steady temporal pattern was played in five different ways: martellato (short and heavy), staccato (short and light), tenuto (long and heavy), marcato (long and heavy), and legato chiaro (long and light). Each separate stimuli was recorded with a uni-directional Trans-continental microphone on a Loree oboe (AK bore). The students were asked to listen to the recording, and within 5 seconds, correspond what they hear to a color (red, orange, yellow, green, blue, or purple).</p> <p><b>Results</b> The results from the first passage, played short and heavy, showed a plurality, yellow (18 out of 40, 45%, chi squared value 31.4). Moreover, light and short styles showed statistically significant responses to be orange, yellow, and green (11 [27.5%], 10 [25%], and 9 [22.5%] out of 40, respectively, chi squared value 11.1). The third passage again showed a statistically significant outcome, that most students associated long and heavy articulation and tone with the darker colors, greens and blues (12 [30%] and 14 [35%] out of 40, respectively, chi squared value 20.5). Then, the fifth passage showed a plurality in blue (13 out of 40, 32.5%), associated with long and sharp styles (chi squared value 13.52). However, no statistically significant conclusions could be drawn from the long and sharp passage, number four. For all chi-squared analysis, the degrees of freedom were 5 and the critical value (p value, <math>p &lt; 0.05\%</math>) was 11.07.</p> <p><b>Conclusions/Discussion</b> The results display that there is a pattern in cross-modal perception, especially within a culturally and physically isolated group. This generally supports the hypothesis that lighter and shorter articulations would yield responses mainly of lighter colors, whereas heavier and longer articulations would entice perception of darker colors. However, it seems that the most selected color groups for all short articulations or long articulations remained the same regardless of emphasis on the beginning of each note, so students seem to be basing their responses mainly on length. This displays how a group of people with similar experiences and culture carry similar cross-modal associations.</p>	
<b>Summary Statement</b> This study supports that it is possible to qualify a unified cross-modal perception of certain musical styles.	
<b>Help Received</b> Ms. Annabel Adriatico, my advisor throughout the entire process, helped with administering the surveys and gathering participants. Dr. Stefanie Drew, a synesthesia expert and my scientist supervisor, provided input as to the project design.	





**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Erika Sanchez; Fatima Zavala</b>	<b>Project Number</b> <b>S0425</b>
<b>Project Title</b> <b>Systematic Review of Studies on the Internet Regarding Self Harm and Suicide in Young People In Ventura</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our objective was to find out whether or not the internet is having an effect on today's youth regarding suicide and self-harm rates.</p> <p><b>Methods/Materials</b> We gave out 249 surveys to people of different age, gender, race, ethnicities, and economic stand points in our school.</p> <p><b>Results</b> From our 249 surveys, results are averaged through each age group and gender. Results varied within different gender and age group.</p> <p><b>Conclusions/Discussion</b> We concluded that the internet has affected self-harm and suicide rates. Answers varied through age and gender. For males overall, used internet less than females which resulted in having less conflict online. Females however, use the internet much more often which results in a more likelihood of being bullied online. Both genders however, reported evenly that they knew someone who has attempted or thought about self-mutilation.</p>	
<b>Summary Statement</b> Our project is about how the internet affects suicide rates and attempts.	
<b>Help Received</b> Classmates helped by being test subjects	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Craig J. Stieler</b>	<b>Project Number</b> <b>S0426</b>
<b>Project Title</b> <b>The Effect of Color in Relation to Recognition of Selected Scents</b>	
<b>Objectives/Goals</b> This is an experiment designed to investigate the effect of color in relation to recognition of selected scents, based off of the Stroop Effect (Stroop, J.R.) 1935, and determined by the correspondence of #fruity# scents and their matching colors.	
<b>Abstract</b> <b>Methods/Materials</b> The experimental (n=10) and control groups (n=10) consisted of 16-18 year old, predominantly Caucasian male and female students, from a rural high school in central California. All of which were acquired through an opportunity sample. The experiment was carried out during two class periods, with one test, and one set of #fruity# scents. On the first test, the #fruity# scents corresponded to their colors (coconut-white, lemon-yellow, etc.). On the second, the #fruity# scents and their corresponding colors were mismatched (coconut-orange, raspberry-white). The independent variable was the participants# ability to identify culturally appropriate colors along with their corresponding scents when presented with incongruent colors and matching scents. The dependent variable was the accuracy of participants# correct recognition of the culturally appropriate scents with the culturally corresponding scents regardless of incongruence.	
<b>Results</b> A one-tailed t-test demonstrated that there was significance at the $p < 0.0025$ level, showing that sight and smell are distinguished together, as one, and both are heavily influenced by each other when it comes to the function of the brain.	
<b>Conclusions/Discussion</b> In conclusion, my calculated T-value of approximately 3.5541 does meet and exceed the critical T-value of 1.734 at 18 degrees of freedom. Therefore, I may accept my hypothesis in that sight and smell are distinguished together in the brain, and are both heavily influenced by each other when it comes to the function of the brain. My hypothesis may be accepted due to the fact that the average number of correct answers given by participants presented with colored sponges that matches their corresponding colors (control group) was 3.2 out of 4; whereas the average number of correct answers given by participants presented with colored sponges that did not match their corresponding colors (experimental group) was 2 out of 4. I may also reject my null hypothesis.	
<b>Summary Statement</b> The Effect of Color in Relation to Recognition of Selected Scents	
<b>Help Received</b> Received help in learning how to use/operate Photoshop for the production of the poster board, and IB instructor help	



# CALIFORNIA STATE SCIENCE FAIR 2014 PROJECT SUMMARY

<b>Name(s)</b> <b>Miribel X. Tran</b>	<b>Project Number</b> <b>S0427</b>
<b>Project Title</b> <b>Cognitive Performance in Schizophrenia and Bipolar Disorder and Their First-Degree Relatives</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To examine differences in cognitive performance among control, SZ &amp; BD patient groups, &amp; their first-degree relatives, and determine the degree of genetic liability of BD &amp; SZ to their first-degree relatives.</p> <p><b>Methods/Materials</b> All subjects in this study were recruited from the UCI Neuropsychiatric Center and/or from the local community. An onsite psychiatrist evaluated the SZ &amp; BD patients for their diagnoses to be in this study. Patients and controls were given a series of standard clinical self-reporting scales that evaluate the patient's symptom severity and type. A computerized neurocognitive test battery, CMINDS (Computerized Multiphasic Interactive Neurocognitive Diagnostics System), was used to assess specific neuropsychological measures in controls and patients with SZ and BD.</p> <p><b>Results</b> Post-hoc statistical comparisons showed significant differences between groups in the predicted direction. As expected, controls performed better than the patient groups (BD, SAD, SCPT) and their first-degree relatives in all of the cognitive tasks. Newman-Keuls post-hoc comparison and one-way analysis of variance (ANOVA) tests revealed significant differences for individual tests and cognitive domains. SAD performed substantially worse than SCPT, with BD performing the best out of all the patient groups. The degree of cognitive deficits in first-degree relatives and controls was also examined using ANOVA for individual assessments. Controls showed significant differences from first-degree relatives in specific individual assessments.</p> <p><b>Conclusions/Discussion</b> Differences in cognitive performance among control, SZ &amp; BD patient groups, and their first-degree relatives, are prevalent and can serve as a significant trait marker for genetic liability in first-degree relatives as well as help distinguish between bipolar disorder (BD) and schizophrenia (SZ). First-degree relatives are subject to the cognitive deficits that their affected relatives possess, and thus, an effective method of treatment and diagnosis for both SZ and BD is suggested for future research.</p>	
<b>Summary Statement</b> The focus of this study is to determine whether cognitive performance can serve as a trait marker between SZ & BD patients and also, to study the degree of genetic liability in first degree relatives in relation to the patient groups.	
<b>Help Received</b> This research was carried out under the guidance of Dr. Julie Patterson at UCI Neuropsychiatric Center, and all research data and software is the property of University of California, Irvine.	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Abberamee P. Visvanathan</b>	<b>Project Number</b> <b>S0428</b>
<b>Project Title</b> <b>Trance of Tech on Teens with Caffeine</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My purpose of doing this project was to find out how teenagers are responding to the drug caffeine while being immersed in the world of technology and how that affects their memory. My goal was to find out what physical effect as well as psychological effect that consumption of caffeine and the use of technology had on a teenager's memory and ability to sleep at night. <b>Methods/Materials</b> 1. Handout forms for the participants and their parents to fill out before the day of the experiment. 2. On the day of experiment, give a number to each participant. 3. Perform control experiment with memory game and calculated test. Collect papers. 4. Divide 60 participants into 4 groups of 15 participants each. 5. Give designated group the necessary items and let them get exposure for 1 hour. 6. After 1 hour, conduct 2nd memory game and calculated test. 7. Analyze data.  60 anonymous teenage participants; PowerPoint slides with images of items; Caffeine Source(s); Technological Equipment; Non Technological Equipment; Paper; Pens/Pencils. <b>Results</b> From my experiment, I discovered that my hypothesis of caffeine having a positive impact on teenager's memory with improved scores was proven right. However, the incorrect part of my hypothesis was that the "Non-technological and Caffeine" group fell asleep with much more ease than any other group. In actuality, the "Non-Technology and Non-Caffeine" group had a much easier time falling asleep as well as getting the necessary amount of sleep. Those who consumed caffeine seemed to have a more difficult time staying asleep all through the night. <b>Conclusions/Discussion</b> Teenagers get less and less sleep as days goes on. Due to the amount of work teenagers are given nowadays in school, they are forced to get little to no sleep majority of the school nights. My hypothesis was partially right. The right portion of my hypothesis was that caffeine actually helped the participants improve their test scores but those participants at the same time did not use technology. The wrong part of my hypothesis was which group had an easier time falling asleep. The group that actually had an easier time falling asleep and staying asleep was the "Non-Technology and No-Caffeine" group. One section that I could have improved in this project is that I could have gotten more participants.	
<b>Summary Statement</b> what the effect caffeine and technology used at the same time affects a teenager's memory and ability to sleep at night	
<b>Help Received</b> Father helped with legal action such as insurance for the hall that the research was conducted	



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Kenneth E. Jeffris</b>	<b>Project Number</b> <b>S0499</b>
<b>Project Title</b> <b>The Effects of Traditional Face-to-Face Learning and Web-Based Distance Learning Using Skype</b>	
<b>Abstract</b> <b>Objectives/Goals</b> This is an experiment designed to investigate the effects of distance learning via a two-way telecommunication service and traditional classroom learning, demonstrated through the scores received on a standardized multiple-choice test. <b>Methods/Materials</b> The experimental (n=13) and control (n=16) groups consisted of 16-18 year old, predominantly Caucasian male and female students from two rural high schools in the western United States. All were acquired through a purposive sample. The experiment was carried out during one class period with one test for both groups. The control group consisted of students in a traditional classroom setting, where a teacher gave a lecture on Bandura's social learning theory. The experimental group consisted of students in a distance learning setting where they received the same lecture at the same time as the control over Skype#. The independent variable was the mode in which participants viewed the lecture, and the dependent variable was the score received on a standardized multiple choice test on the material covered in the lecture. <b>Results</b> A one tailed t-test demonstrated that there was no significant difference at the $p < .05$ level, showing that distance learning is a plausible substitution for traditional classroom learning. <b>Conclusions/Discussion</b> In conclusion, the null hypothesis, which in reality was the research hypothesis, failed to be rejected. There was no significant difference at the $p < .05$ level between the comprehension levels of students who received a lecture over Skype # and those who received it in a traditional classroom setting.	
<b>Summary Statement</b> The aim of this study is to replicate the findings of Collins and Pascarella (2003) to show that students who learn over a distance over Skype# learn just as effectively as those who learn in a traditional classroom setting.	
<b>Help Received</b> Under supervision of IB Psychology teacher.	