CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Priyanka S. Adapa

Project Number
J0301

Project Title
Let's Make a Deal: A Ratio Problem

Abstract

Objectives/Goals
The objective of my project is to test the Let#s Make A Deal Game Show Paradox. Let#s Make A Deal was a 1970's game show problem where a person picked a door and then was given the choice to switch doors to another door or keep the same original door that they picked. Behind these doors was a Grand Prize. The object of this game is to find the Grand Prize.

Methods/Materials
The materials that I needed to complete my experiment were: 3 plastic cups, one ball, a person to test on, paper, and a pencil. My experimental procedure was exactly this: 1)Put the three plastic cups you have into one row by setting them side-by-side. 2)Since you are the host you have the privilege of hiding the Grand Prize, which is the ball. While hiding the ball, tell the person you are experimenting on to turn around or close their eyes so that they don#t see where you#re hiding the ball. 3)After hiding the ball, tell the person you are experimenting on to pick a cup that they think the ball is hiding under. Do not give hints or else the answer will not be accurate. 4)After the person picks the cup under which they think that ball is hiding, pick up a cup to show them that the ball isn#t hiding under there. Do not pick up the cup that they thought it was in and do not pick up the cup that the ball is really in. 5)After this, ask them if they want to switch their choice to which cup the ball is under. 6)If they switch or don#t switch pick up the cup, which was their final answer, and show them if they won. If they didn#t win show them the cup where the ball was the whole time. 7)Record this answer on your paper. 8)Make more and more results to use by repeating this procedure about 50 times for each person that you experiment.

Results
My results came out like this after all my tests and trials:
1)3 out of the 5 people I tested showed in their results that they would most likely win by not switching.
2)2 out of the 5 people I tested showed in their results that they would most likely win by switching.

Conclusions/Discussion
The data supported my hypothesis, People win more often by not switching.
My evidence is a 3/5 ratio is bigger than a 2/5 ratio. The 3/5 ratio stands for how many people won by not switching over how many overall people were tested. The 2/5 ratio stands for how many people won by switching over how many people were tested.

Summary Statement
My project is about a game show that has a winner pick one out of three doors and after they pick their original door will they win more by switching or not switching because after their original pick they are given these options.

Help Received
My Mom helped take pictures.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Megan M. Bernstein

Project Number
J0302

Project Title
What's Driving Your Reaction?

Abstract

Objectives/Goals
Reaction time is an imporatnat safety factor for drives. This project explores a way to improve how cars work to decrease driver reaction time. The experiment tests whether using two simultaneous stimuli, such as both light and sound, decrease reaction for both male and female subjects. The hypothesis was that using two simultaneous stimuli will decrease reaction time for both male and female subjects.

Methods/Materials
A reaction time testing device was built that presents either a single stimulus or dual stimuli and drops a dowel simultaneously. The test subjects stop the dowel by pinching the PVC tube. Reaction time was computed based on the distance the dowel fell. The testing device was composed of an electromagnet, a switch that turned from electromagnet to stimuli, a switch that selected the stimulus (light, buzzer, or both), and a PVC tube that held the dowel.

Results
Test subjects responded to the buzzer and light together and the buzzer alone with comparable reaction times; these were significantly faster than the light alone. Male subjects reacted faster than females. Male subjects reacted fastest to buzzer, then light and buzzer, and then lastly light. Female subjects reacted fastest to light and buzzer, then buzzer, and lastly then light.

Conclusions/Discussion
In conclusion, this report showed three things. First, using dual stimuli didn#t decrease the reaction time compared to the buzzer overall. Second, males demonstrated faster reaction times than females. Third, the practice effect was strongest for the light stimulus, less noticeable for the dual stimuli and not noticeable for the buzzer stimulus. Perhaps this was because people were more distractible from the light than the buzzer.

Both male and females clearly respond faster to audible stimuli than visual stimuli. However, most emergency driving situations are signaled with visual stimuli, such as brake lights or signal lights. Adding audible signals in a car automatically triggered by emergency situations could decrease driver reaction time and improve overall car safety.

Summary Statement
This project explores whether presenting two stimuli decreases reaction time comared to presenting a single stimulus.

Help Received
Father helped with soldering and taught skills to assemble device.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
David S. Bettwy

Project Number
J0303

Project Title
Voice Stress Analysis Under Low-Stress Conditions Using an FFT Analyzer

Abstract

Objectives/Goals
The purpose of this project is to test whether lies, made under low-stress conditions, can be detected using a Fast Fourier Transform (FFT) analyzer to analyze the dominant frequencies of discrete portions of a response. The hypothesis is that lying causes stress, which causes increased frequencies in the sound of a voice, which an FFT analyzer can detect.

Methods/Materials
A control question test (CQT) was devised in which each subject was given a set of 12 cards (8 control and 4 test questions). Each card had either a #2# or a #3# printed on it. At least one of the cards also had the word #lie# printed under the number. For each of the cards, the subject was asked the question, #Is the number printed on the card a 2?# The subject was instructed to tell the truth in response to every question unless the word #lie# appeared on the card. During questioning, the subject#s verbal responses were recorded directly onto a computer to obtain a high-quality recording. The responses were viewed with sound-editing software (Cool Edit) in a waveform, and an FFT analyzer was used to analyze dominant frequencies along the waveform. The frequencies of a control (truthful) response were compared to the frequencies of each test response to determine whether the test response was a lie.

Results
The sound of the voice during a deceptive response under low-stress conditions generally had increases in frequency (Hz) that could be detected using a Fast Fourier Transform (FFT) analyzer.

Conclusions/Discussion
The results indicate that the hypothesis was correct. Given the results of this experiment, a voice stress analyzer could be developed, using an FFT analyzer, to compare discrete samples of control and relevant responses. The program should indicate the net difference in frequency so the user can gauge the probability that the response is deceptive. To develop such an analyzer (an FFT-VSA), VSA experts should collaborate with FFT experts. It would also be helpful to determine, using an FFT analyzer, whether the changes in the frequencies of the voice due to the stress of lying are different than the changes that are caused by the stress of other emotions such as fear, anger and nervousness.

Summary Statement
In this project, an FFT analyzer was used to detect changes in the voice while lying under low-stress conditions.

Help Received
Received demonstration from local police department on the use of its voice stress analyzer; received information from military experts about current studies on voice stress analyzers.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Emily Blythe; Katherine Ward

Project Number
J0304

Project Title
Clutter Confusion

Abstract

Objectives/Goals
Purpose: It is our goal to determine the effects of clutter on memory. We have designed a word test to be given to test subjects to determine the effects of cluttury on memory. Our objective is to determine how changes in environment and background effect memory retention and/or loss. Investigative Question: Do cluttered backgounds help or distract the memory? Hypothesis: We think that the busy background will distract the subjects, and they will remember fewer words.

Methods/Materials
Materials: Subjects (80), notebooks, pencils, list of 20 words on a blank sheet of paper, same list of words on a cluttered piece of paper, stopwatch. Methods: Test 40 subjects (control group). Give each subject 30 seconds to memeorize words on a blank piece of paper; take away the list and allow 60 seconds to write down rmembered words. Repeat process to 40 subjects in the experimental group, but with a list of words on the cluttered piece of paper.

Results
(Number of words remembered) Experimental group: 6.90, Control group: 7.42.

Conclusions/Discussion
7% more words were remembered by the control group. We think the cluttered page caused interference with the experimental group's ability to memorize words. Our conclusion is that clutter confuses a person's ability to remember what they see and interferes with the ability to memorize.

Summary Statement
Does clutter confusion interfere with a person's ability to memorize words.

Help Received
Our mothers helped with transportation to and from our homes. Our fathers taught us how to generate graphs on the computer.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Amy A. Bogart

Project Number
J0305

Project Title
Power of the Mind: A Study of Positive Reinforcement

Abstract

Objectives/Goals
Most sport spectators like to cheer for their favorite team. Do the individual athletes perform better when they hear the "positive reinforcement" of a cheering crowd? Knowing this information might help athletes, coaches and even spectators to look at positive reinforcement differently. Building up an athlete's confidence through positive reinforcement could be much more helpful than only giving corrections or negative feedback. The information may be helpful in motivating the athletes, coaches and teams to feel and act more positive about their sport. Hypothesis: "Positive reinforcement will affect an athlete's performance in a favorable way."

Methods/Materials
Six tests were developed and given twice to 15 competitive gymnasts. The first time each test was given there was no positive reinforcement. The second time there was cheering. My materials were 15 participants, who were competitive gymnasts between the ages of 10-14. I also used a judge to score the two events. I used one permission slip for each participant and a spread sheet to record my results. I also used 5 different tests, which were: the uneven parallel bars, the vault, push-ups, tuck-ups, and v-ups.

Results
From my 5 tests described above I created the following results:
79% of all participants were affected positively by the positive reinforcement.

13% of all participants were affected negatively by the positive reinforcement.

8% of all participants were not affected by the positive reinforcement at all.

Conclusions/Discussion
With 79% of the participants improving their scores while receiving positive reinforcement my hypothesis was proven. The 13% that did worse with the cheering may have been tired from the first test, however, the 79% that did better may have been tired too but the cheering may have made them try harder. Looking at the results I can see that positive reinforcement helps most athletes perform better.

Summary Statement
My project is about positive reinforcement and how it affects an athlete's performance.

Help Received
My coaches helped judge the subjects and cheer them on. I used my gymnastics team for this project, they were used as participants. I also used my mom to proofread my work and assist me with purchase of the project display materials.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Matthew Ira Bohrer

Project Number
J0306

Project Title
The Effect of Eye Color on the Ability to Distinguish Between Colors in Low Light

Abstract

Objectives/Goals
My objective was to determine whether or not there is a difference in the ability of people with different eye colors to distinguish between the primary colors at different levels of light.

Methods/Materials
I tested 100 subjects who were identified as NOT being "color blind" according to an Ishihara Test for Color Blindness. I went about my testing by having each person look into a black box that had a book light inside. Mounted on the inside back wall of the box was a card with the three primary colors. There was a viewing slit cut in the front of the box. Placed inside the box and behind the viewing slit was a piece of card stock with seven viewing slits cut in it, each with layers of neutral density filters taped behind them. Neutral density filters are light filters which lower the amount of light seen without changing the color of the light. There were seven different levels of filters for the subjects to look through and they were numbered from one to seven, with one being the darkest and seven being the lightest. The subjects looked through the darkest shade and told what they could see, then through a lighter shade, and then a still lighter shade until the subjects had seen all three primary colors or there were no more slits with filters to look through. For each subject I recorded their eye color and the level at which they were able to distinguish each of the three colors.

Results
I found that the percentage of people with brown eyes who could distinguish the colors in the lower levels of light was higher than the percentage of people with blue and green eyes who could. The difference between brown- and green-eyed people approached statistical significance ($p = .0530$) for the color red.

Conclusions/Discussion
Darker eye color may help people see darker colors, such as red, at low levels of light. Further research on this relationship would be useful.

Summary Statement
For this project I tested 100 people to determine whether or not there is a difference in the ability of people with different eye colors to distinguish between the primary colors at different levels of low light.

Help Received
Father discussed different possible topics with me; mother helped type and assemble report and get various materials; lighting designers helped identify the filters to use to reduce the amount of light without changing color.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Christine M. Bui

Project Number
J0307

Project Title
Memory and Intelligence: A Spatial Approach

Abstract

Objectives/Goals
Can birds learn to recognize the position of a food hole or patterns in food holes on a food board and can they apply this knowledge intelligently to new environments? I believe that the birds will memorize the position and pattern of food holes and will progressively find the food faster. I also hypothesize that the birds will be able to apply the previous knowledge of a food board to the next board to find the food in a shorter amount of time.

Methods/Materials
Four food boards of different shapes and containing different amounts of holes were created. The birds were tested individually on one board at a time; the four boards in order of experimentation were the rectangular board with six holes, rectangular board with twelve holes, triangular board, and circular board. In the first two boards, one hole contained seeds, while in the latter two boards four holes contained seeds. Each hole on each board was covered with cotton; the birds had to lift the cotton and find the food below. During each trial of ten minutes, a bird was timed for the amount of time it took to find the food, and behavior was also noted. Each board required the birds to be tested once a day in the afternoon for ten day.

Results
The time in which the birds found the food hole or food holes on each board nearly consistently decreased as they completed more trials. The birds usually found the food hole in less than twenty seconds for the rectangular board with six holes, and in less than ten seconds for the rectangular board with twelve holes. The birds consistently found at least three of the four food holes on the triangular and circular food boards.

Conclusions/Discussion
Zebra finches can memorize the position of one food hole on a food board, and find it within a few seconds. They can also memorize at least three food holes in a pattern on the boards, but it is more difficult than a single hole. The birds use knowledge gained in exploring a previous board to adapt to a current board more easily and memorize the positions of the holes. This research can lead into other areas of study about memory and intelligence of birds.

Summary Statement
This project investigates the intelligence and spatial memory of zebra finches in finding food.

Help Received
Dad cut wood and drilled holes for boards, Mom occasionally cleaned cages, brother helped with technical difficulties (digital camera), Mrs. Goossens gave advice

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Daniel J. Combs

Project Number
J0308

Project Title
Are You Scared Yet? What Effect Does Being Scared Have on Your Blood Pressure?

Abstract

Objectives/Goals
What effect does being scared have on your blood-pressure? My objective was to see whether my mom's blood-pressure would go up during scary moments in movies. Being scared is part of a mammal's survival instinct. I think fear makes blood-pressure go up, which would help you either fight or flee.

Methods/Materials
My materials were: a manual blood-pressure cuff, an electronic blood-pressure machine, a stethoscope, a soothing music CD, and three scary movies.
Method: I went to my chiropractor who taught me how to take blood-pressure. Then I took my mom's blood-pressure while she listened to soothing music. I did it four times to get an average of her "calm" numbers. Next, she watched scary movies and I took readings (4 times per movie).

Results
Two of the movies, "Carnasaur" and "Alien" produced a greater reaction than the third movie "Salem's Lot". In fact, "Salem's Lot" was just corny enough that it produced more mellow readings than Mom's "at rest" readings. My mom's normal blood-pressure is on the low side of "normal"; she's a pretty mellow person and not easily scared. Her reactions were not as dramatic as I hoped for.

Conclusions/Discussion
My hypothesis was correct. Being anxious or scared does affect your blood-pressure. People like to watch scary movies because it is exciting and lets them experience the "fight or flight" feeling without being in danger.

Summary Statement
What effect does being scared have on your blood-pressure?

Help Received
Dr. Karen Rinkleib taught me to take blood-pressure; Mom helped with art, typing, being lab rat

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Michaela P. Daniel

Project Number
J0309

Project Title
Which Hand Is More Sensitive?

Abstract

Objectives/Goals
My project was to determine whether the sensitivity of a hand has any relation to whether it is the dominant hand.

Methods/Materials
Informed consent was obtained from 44 randomly selected people ranging in age from 8 to 67. Each person was asked to trace his/her hand palm side up on a piece of gridded paper. The same was done for the other hand. Each person indicated whether they were left or right handed.
A lamp and a racquet were positioned in a box so that the light shining through the racquet projected a grid pattern onto the subject's palm. The box prevented the subject from viewing his/her hand. Next, the subject's palm was lightly poked in three different places, using a different object (out of three)each time. The subject recorded the location and material of each touch on the gridded paper on which s/he traced his/her palm. The subject then placed the other palm in the lamp box, undergoing the same procedure as the first palm.

Results
The right handed people had more sensitivity in their right hands, the left handed people in their left, but what I found was most interesting was that the left-handed people showed more sensitivity overall, providing the most correct responses.

Conclusions/Discussion
The dominant hand is more sensitive to touch than the other hand.

Summary Statement
My project is about how the dominance of hands affects the sense of touch.

Help Received
My mom helped provide subjects, and my dad helped me put the lamp box together.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Eden C. Delphey

Project Number
J0310

Project Title
Talking on a Cell Phone while Driving: Is It Dangerous?

Abstract

Objectives/Goals
The objective was to determine if talking on either a hand-held or hands-free cell phone while driving interferes with steering, scanning and concentration skills necessary for safe driving.

Methods/Materials
A driving simulator program that scores drivers on steering, scanning and concentration was installed on a home computer, along with a steering wheel and brake pedals. Thirty-four participants age 16 or older "drove" the course under these driving conditions: (1)without any distractions, (2)while answering questions on a hand-held cell phone, (3)while answering questions on a hands-free cell phone and (4)while counting backwards from 400 by 7s.

Results
The total score (steering, scanning and concentration combined) that drivers received when talking on a hand-held cell phone was, on average, 24% lower than the score they received when driving undistracted. However, their steering score was only affected a little by the cell phone conversation. The main interference was with scanning and concentration. When drivers used a hands-free cell phone, all interference with steering was eliminated, but total scores did not improve much because answering mentally challenging questions still caused a lot of interference with scanning and concentration. Drivers also had problems with scanning and concentration (but not steering) when trying to drive while counting backwards.

Conclusions/Discussion
My conclusion is that talking on either a hand-held or hands-free cell phone interferes with scanning and concentration. Using a hands-free phone gives drivers a little better steering control, but the real problem - driver inattention to what is going on around him - is not eliminated. Steering seems to be a more mechanical task that can be done even if the driver is distracted.

Summary Statement
This project uses a driving simulator program on a computer to test whether talking on a cell phone while driving interferes with steering, scanning and concentration abilities.

Help Received
My mother helped me find an affordable driving simulator program to use and asked the questions over the phone to each subject while I ran the tests.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Elizabeth M. DePonte

Project Number
J0311

Project Title
Spatial Skills: Can They Improve with Practice?

Abstract

Objectives/Goals
The objective of this project was to discover if students could improve their spatial skills with training. The experiment also tried to determine if age would affect the amount of improvement through training for a spatial task.

Methods/Materials
One hundred students from grades five, six, seven, and eight were tested. Half of the subjects from each age group were tested with only two shapes to trace: a circle and a star, in consecutive order. This group was the "control" group. The other set of subjects were given six shapes, beginning with a circle and ending with a star. This group was labeled the "training" group. All students were timed and allowed a maximum of three minutes to trace each shape, while looking only in a mirror and being unable to look directly at their hands. All "tracing sheets" were later checked to count the number of mistakes made by each subject.

Results
The control group results for the percent of students who were able to trace the last shape within the three minute time limit were: 35% of fifth graders, 27% of sixth graders, 57% of seventh graders, and 50% of eighth graders. The percentage of training subjects who successfully completed the last shape were: 53% of fifth graders, 60% of sixth graders and 100% of both seventh and eighth graders.

Conclusions/Discussion
With only a brief training period, the experimental ("training") groups performed significantly better than the control groups in all grade levels. Older students showed even more dramatic improvement than the younger students.

Summary Statement
The purpose of this project was to discover if students could improve their spatial skills with training.

Help Received
Mrs. Hunker permitted me to use her classes for testing.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Aaron P. Gallagher

Project Number
J0312

Project Title
Eyes versus Ears

Abstract

Objectives/Goals
The purpose of my science project was to determine if people respond more quickly to visual or auditory stimuli. My hypothesis was that people would respond faster to a tone than a graphic.

Methods/Materials
Using REALBasic, I made a program called the Response Tester. I put the program on my website. Participants downloaded the program and took the Response Test. I also tested my classmates on a laptop in the classroom.

The Response Tester program randomly made a beep or displayed a red dot. The test subjects pressed the space bar as quickly as possible after each beep or dot (10 times each). The program recorded the time within a thousandth of a second. Then it averaged the times for the beep and the graphic to determine if the person responded more quickly to visual or auditory stimuli.

I made the program so that if the participant tried to cheat by clicking the space bar over and over the Response Tester would ignore the space bar for five seconds and then return to normal. I also eliminated entries that were duplicates, hacked under 100 milliseconds or over 1,000 milliseconds.

Results
My hypothesis was that test participants would respond quicker to the tone. I was wrong. Thirty-seven of the 102 people tested averaged faster with sound. The other 65 averaged quicker to the graphic.

Conclusions/Discussion
Subjects of my research responded faster to the graphic stimuli, rather than the auditory stimuli as I predicted. The average response time to graphics as .3144 seconds and the average response time to sounds was .3434 seconds, a difference of .029 seconds.

I learned that in behavior science until you test the participants, your hypothesis is really just a guess.

Summary Statement
Do people respond quicker to visual or auditory stimuli?

Help Received
Mother and Father discussed project with me.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Roxanne S. Gibson

Project Number
J0313

Project Title
Investigating Rats' Ability to Distinguish Scents

Abstract

Objectives/Goals
Scientists have been conducting experiments on rats for a long time. In the first half of the 20th century, scientists concentrated on understanding the physiology of rats. Many of these experiments included testing the rats# five senses. This experiment tested whether rats can discriminate between different scents if they are trained at an early age to associate that scent with food.

Methods/Materials
The subjects, nine female, albino, Simonsen out-bred rats, were put into three groups. Each group was assigned and trained to recognize a different scent. A maze was created to test the rats# ability to distinguish between the scents. Each rat was timed to see how long it took them to go through the maze.

Results
The results were that all groups improved over time. The no scent group started out with the best times, but improved the least during the experiment. Both the cinnamon group and peppermint group times through the maze improved significantly.

Conclusions/Discussion
The experiment concluded that the rats could be trained to distinguish between the different scents.

Summary Statement
The project tested rats' ability to distinguish between different scents to find food when they were trained from an early age.

Help Received
Dad helped build the maze. Mom helped with the board. Oma helped edit the paper. Pappy helped print the digital pictures.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Joshua W. Grondalski

Project Number
J0314

Project Title
Rat Race!

Abstract

Objectives/Goals
I think each time a rat would go through a maze, the running time would be faster than the previous time. Each rat will learn to go through each new maze easier and faster each time it is put through a trial.

Methods/Materials
Three young female rats were used as the test subjects. A 3 foot 2 ½ inch by 4 foot plywood board, with a checkerboard pattern of 3 x 3 inch squares cut into it, was used as a base for the maze. Sheet metal 5 inches in height of various lengths (multiples of 3 inches) were used for the walls. This allowed easy changing of the maze. I drew five different maze designs on graph paper. Each maze design has twenty turns and ten dead ends. The start and the finish for each of the five mazes rotated so they were not located in the same spot for each maze. Special treats were placed at the finish line each trial run. I decided to have each rat have ten trials in each maze over a five day period. Each trial time was recorded in my log book.

Results
The data shows that each time a rat ran through the maze, her time was improved. With the exception of a few trials, each rat improved its clocked running time through each new maze.

Conclusions/Discussion
I saw that rats improved their trial times each time through the maze. They also improved their times with each new maze faster than the previous one, for the most part. I learned that rats have a very good learning capacity or short-term memory and can memorize things easily.

Summary Statement
Three rats ran through 5 different mazes to test their learnig ability.

Help Received
Grandpa & Dad helped with maze, Mom helped with project display

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Warren Guess

Project Number
J0315

Project Title
Do Video Games Influence Heart Rate?

Abstract

Objectives/Goals
The goal is to see if different types of video games influenced different aged children's heart rate.

Methods/Materials
I took four children, ages 10 - 13, measured their resting heart rate, had them play a sports electronic video game for ten minutes, then took their heart rate again. After I had done this for each student, I waited a day, then tested them again playing an electronic video role-playing game. Again, I waited another day and repeated the experiment using a fighting electronic game.

Results
The fighting game caused the most increase in heart rate and influenced the 11 and 12 year olds the most.

Conclusions/Discussion
My conclusion is that a high violent video game, such as a fighting game, causes the greatest increase in heart rate. A video game that is rated for older people may be because the game causes an increase in heart rate.

Summary Statement
My project is to see if different types of video games influence the heart rate of different aged children.

Help Received
Students at my school volunteered to participate in the experiment, with parental permission. My mother helped in proof-reading and making suggestions in the report. She also helped with my display board. My brother, Denver, made my cardboard display "PlayStation".

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Amy L. Gutierrez

Project Number
J0316

Project Title
The Stroop Effect with Numbers

Abstract

Objectives/Goals
My objective was to see if people have difficulties saying a number for example 4, when that number has something around it. For example if there's a number 4 and it has little number 3's around it,it's to prove if people would say the regular number(4) rather than the number that it has around.

Methods/Materials
The experiment was tested on 50 13-14year old students from Nimitz Middle School with their consent. Out of those 50, 25 were females and 25 were males.They were presented with a sheet that had numbers on it. There were a total of 10 numbers, out of those 10 numbers, 5 were congruent numbers for example 1,2,3,4... and the other 5 were incongruent, for example the number 4 with little 3's around it, 5 with little 4's around it and so on. hat was then done was that the seconds that each gender took were recorded to determine how long did each gender tke to name first the incongruent numbers and then the congruent numbers. Afterwards the data was recorded consisting of the overall responses,of both males and females seconds of incongruent and congruent numbers.

Results
The results showed that consisting of gender on the congruent numbers the males were faster on naming the congruent numbesr with 1.53 seconds average when the females were 1.67. Also consisting of gender on the incongruent numbers, the males were slower with 3.03 seconds average when the females ended up with 2.87 seconds. Overall of both genders, to say the incongruent numbers both gneders took about 2.98 seconds and both genders took 1.66 seconds to say the congruent numbers.

Conclusions/Discussion
My conclusion ended up to be that the males were faster on saying the congruent numbers when the females were faster on naming the incongruent numbers faster than the males. Overall both genders took longer to say the incongruent numbers rather than the congruent. At the end people do have difficulties saying a number when that number has somthing around it.

Summary Statement
My project is about converting the stroop effect ,which deals with colors and word processing, to numbers that deals with incongruent and congruent numbers.

Help Received
The only help I got was my English teacher revised my research. Other than that I was on my own.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Jamie E. Hadley

Project Number
J0317

Project Title
Dog's Television

Abstract

Objectives/Goals
To determine which dogs respond more to sights and sounds on television. Smaller dogs tend to be smarter, hyperactive and very alert, especially terriers. Larger breeds are more laid back, easy going and relaxed. From this observation I conclude that the smaller dogs will watch television more than larger dogs. Also younger dogs will watch more television than older dogs.

Methods/Materials
Materials: Survey, pens, paper, variety of dogs and owners, 30 minute video tape of sights and sounds from television.
Method:
1. Create and conduct a survey with dog owners
2. Gather data from the dog owners based on their observations of their dog watching television.
3. Distribute the video tape and survey dog owners based on their dog watching the video.
4. Gather data, analyze and draw conclusions.

Results
Dogs that were older than five years of age did not respond to sounds on the television. Smaller dogs were more responsive to television visuals than larger dogs. The class of dog had no effect on the amount of response to television, neither sounds nor visuals.

Conclusions/Discussion
Younger, smaller dogs respond more consistently to television than older, larger dogs.

Summary Statement
To determine what types of dogs respond to sights and sounds on television.

Help Received
Mother bought all my supplies and drove me to the dog park several days to conduct the survey.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Brianna J. Hogg

Project Number
J0318

Project Title
E-World versus Real World, Reading Comprehension

Abstract

Objectives/Goals
The objective of this project was to determine if a person's reading comprehension is greater when reading written material on paper or from a computer screen. I believe that the majority of people tested will have better comprehension when reading from paper than a computer screen.

Methods/Materials
Twenty people were given ninety seconds to read a short paragraph printed on a piece of paper. They were then given sixty second to take a test written on paper to measure their comprehension of what they read. The same twenty people were given ninety seconds to read a different short paragraph from a laptop computer screen. They were then given sixty seconds to take a test written on paper to measure their comprehension of what they read on the computer screen. Half of the test group read test "One" from the paper and test "Two" from the computer. The other half of the test group read test "Two" from the paper and test "One" from the computer screen. The tests were graded to determine the number of correct answers.

Results
The data obtained supported my hypothesis that the majority of people tested have better comprehension when reading from paper than a computer screen. The average number of correct answers of the test of comprehension when reading from the computer screen was 6.5. The average number of correct answers of the test of comprehension when reading from the paper was 8.0. The majority of people tested had better comprehension when reading from paper than a computer screen. Eighty percent of the subjects tested, scored higher on the test related to the passage printed on paper than the passage read from the computer screen.

Conclusions/Discussion
As technology continues to develop, more of our daily tasks are completed using the computer and it appears from this experiment that reading comprehension is negatively affected by reading from a computer screen. Therefore, it is important for people designing things, such as, software or web sites to incorporate techniques to assist in communicating with their audience. This may include things like proper font style and color selection, as well as, size. This experiment also demonstrated that if a thorough understanding of a piece of written material is of great importance, that paper is a better medium for presenting the information than the computer screen.

Summary Statement
This experiment was done to determine if people have find it more difficult to comprehend material read from the computer than from paper.

Help Received
Father assisted with proofreading of my material and reviewed the assembly of my board.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Dana M. Hoolko

Project Number
J0319

Project Title
The Effects of Heavy Exercise on Fine Motor Skills

Abstract

Objectives/Goals
My objective was to learn what effects heavy exercise had on fine motor skills.

Methods/Materials
Materials included a stopwatch, a questionnaire, 3 millimeter-wide beads, 3 inch beading needles, a 23 centimeter step, and human subjects.
In the beginning of the procedure subjects were given a questionnaire that consisted of 20 general questions. This was used to calm the subject and lower their heart rate. After the questionnaire was completed the subjects# heart rate was taken. The subjects were then given directions on the beading procedure. In this procedure the subjects had to place as many beads as possible on a needle in one minute. The number of beads threaded by the subject was then counted. Immediately after completing the beading procedure a modified version of the Harvard step test was administered. Following the 3-minute step test the subjects# heart rate was taken again and the results were recorded. Immediately after taking their heart rate the subjects repeated the same beading procedure and the number of beads threaded was recorded and compared.

Results
The average time used to complete the questionnaire was 3 minutes 24 seconds. The average resting heart rate for the subjects was 73 beats per minute and the average amount of beads threaded before exercise was 15. Most subjects stayed at a steady pace during the Harvard step test (between 2-4 seconds per completed step) and their average increased heart rate rose to 140 beats per minute. In the final beading procedure each subject beaded an average of 17 beads. After all experiments were completed the difference in beading totals were averaged and improvement was noted in 80% of the tests.

Conclusions/Discussion
It was hypothesized that heavy exercise would have a negative effect on fine motor skills. Contrary to this statement, fine motor skills actually improved after exercise. Eighty percent of the subjects tested showed improvement on fine motor skills and only 20% demonstrated a negative effect.
Though the results differed from those stated in the hypothesis the information found is important and useful. Individuals who use fine motor skills in their careers or hobbies should recognize the advantage of a brief full body warm-up prior to the use of fine motor skills. The findings of this experiment suggest an improvement could be expected in fine motor skills 80% of the time from such a warm-up.

Summary Statement
My project studied what advantages or disadvantages heavy exercise would have on fine motor skills.

Help Received
Mother and father proof-read work, Mrs. Donoghue, teacher, gave guidance and encouragement.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Alexander L. Knopper

Project Number
J0320

Project Title
What Type of Directions Do Students Comprehend Best?

Abstract

Objectives/Goals
My project was to determine whether fourth grade students comprehend directions better with visual, aural, or typed directions. My hypothesis was that the students given the directions visually would have a higher average rate of comprehension.

Methods/Materials
I had three separate tests involving 104 fourth grade test subjects. One group was given visual directions displayed in color on computer paper. One group was given aural directions by a prerecorded cassette tape. The final group was given typed directions on computer paper. I tested the comprehension of the subjects by using three separate but equal tests, with only the method of directions being changed. Each group was given the same test to measure their comprehension of the directions.

Results
The visual directions produced the highest average score of 48%. The aural directions produced the second highest average score of 34%. The average score of students given typed directions was 29%. Females comprehended directions best overall with an average score of 40%. The male subjects had an average score of 33%. My results supported my hypothesis because students who were given visual directions had the highest average score.

Conclusions/Discussion
My conclusion, as predicted in my original hypothesis, is that visual directions are most effective in instructing fourth grade students. Visual directions would increase the productivity in digesting and understanding information in the average fourth grade class.

Summary Statement
My project is about what type of directions is comprehended best when instructing students in the classroom.

Help Received
Mother helped organize test subjects. Father help with computer programs.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Elise S. Levi

Project Number
J0321

Project Title
Mission Impossible? Your Blood Pressure

Abstract

Objectives/Goals
The purpose of this project was to discover whether or not action movies had an effect on children#s blood pressure. The change in blood pressure was also compared between boys and girls. The expectation was that boys would show a stronger response in blood pressure variation than girls.

Methods/Materials
In order to test this, permission slips were sent out to parents at Soille San Diego Hebrew Day School to request their approval for student participation as human subjects. After permission slips were collected, each subject was administered a blood pressure reading with a sphygmomanometer prior to an intense two minute video clip of #Mission: Impossible#. Immediately after the film was shown, one additional blood pressure readings were taken.

Results
The results showed that male student blood pressure levels changed slightly after the movie clip, while the females# had stayed approximately the same. Therefore, it was concluded that, as the hypothesis, the males had a greater stress reaction to the movie, which increased their blood pressure.

Conclusions/Discussion
The results support the hypothesis. They show that in general children#s blood pressure is affected by action movies. Males showed higher response in blood pressure variation than females.

Summary Statement
The effect of action movies on blood pressure.

Help Received
Jake Levi helped type report:; Erin Willard helped organize board; Dr. Michael Welch and Dr. Alan Maisel provided important information; Ms. Julie Reynolds, my science teacher provided guidance throughout my entire project.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Allison C. Lo

Project Number
J0322

Project Title
Will Color Contact Lenses Block Peripheral Vision?

Abstract

Objectives/Goals
My objective is to determine if the series of color surrounding the pupil on the color contact lenses will block the user's peripheral vision.

Methods/Materials
1 color contact lens, 1 clear contact lens, 1 eye patch, 1 gauze pad, a peripheral field testing machine, 1 contact lens case, contact lens disinfecting solution, and multiple test subjects. Test subjects wore the clear contact lens on their right eye and an eye patch was wore on top of the left eye. Then I tested their peripheral vision on a peripheral field testing machine. Each test took take about five minutes. After the test, test subjects took the clear contact off, rinsed it, and then put it in the contact lens case. The same steps were repeated again, but this time a color contact lens was used instead.

Results
The purpose of my testings was to discover if color contact lenses blocked peripheral vision. Of the two testings that were done, clear contact lenses proved to work better. On both trials, people who wore the clear contact lens tended to miss less points on the peripheral 68 point screening test than while wearing the color contact lens. The results showed that an average of 9.8% peripheral vision was lost when wearing clear contact lenses and that for color contact lenses, an average of 18.6% peripheral vision was lost. This is an 8.8% decrease of peripheral vision when you switch from clear contact lenses to color contact lenses. My test subjects also complained that while taking the peripheral visual test wearing a colored contact lens, he or she experienced haziness and blurriness, especially when looking through the side of their eye. An 8.8% decrease of peripheral vision may be insignificant to color contact lens wearers during daytime. But on a dark night 8.8% loss of peripheral vision can result in a car accident.

Conclusions/Discussion
My conclusion is that color contact lenses do block peripheral vision and that it can be detrimental to your health especially if you are driving during nighttime and cannot see well. Many of my test subjects complained during the testing, that their vision was somewhat hazy especially when looking through the side of their eye with a color contact lens. Through my experiment and testing, I would advise all contact lens wearers to use clear contact lenses instead of color contact lenses because they do not block your peripheral vision and enable your to see more clearly.

Summary Statement
My project was about color contact lenses and how they will affect a person's peripheral vision.

Help Received
My mom and dad helped me design my board. My father supervised my testings.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

Shana Makos; Amanda Williams

Project Number

J0323

Project Title

Is a Picture Really Worth a Thousand Words? The Effect of an Illustration on a First Grader's Listening Comprehension

Abstract

Objectives/Goals

The objective was to discover if first graders have better listening comprehension when viewing an illustration while listening to a story.

Methods/Materials

A short story, an illustration, and questions were created. One hundred two students were tested. Half were girls and half were boys. Half of the boys and girls were read the story without the picture, and the others viewed the illustration while listening to the story. All were questioned without the illustration. All were individually read the story and tested without distractions from the classroom. After testing all students available, data was calculated and results found.

Results

Students who viewed the illustration while listening to the story answered four out of the five questions more precisely than students who did not see the illustration.

Conclusions/Discussion

First graders do have better listening comprehension when they view an illustration while listening to a story. First graders will remember more information if they have a visual aid.

Summary Statement

Our project was to find out if viewing an illustration while listening to a story improved a first grader's listening comprehension.

Help Received

First grade teachers allowed us to test their students. Parents drove us to the library, elementary school, store for supplies, and each other's home. A college age cousin taught us how to make the graph on the computer.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Matthew McLoon

Project Number
J0324

Project Title
Sensory Reaction Time Differentials

Abstract

Objectives/Goals
The goal of this project was to determine which of the three senses-- sight, hearing, or touch--produces the quickest reactions in humans. My hypothesis was that the sense of sight would produce the quickest reactions.

Methods/Materials
I tested thirty subjects on a testing device. The device held a suspended ruler and the test subjects attempted to catch the ruler quickly after it dropped based upon a stimulation of one of their senses (which occurred simultaneously with the ruler dropping). When the subject grabbed the ruler, I recorded the closest metric measurement to where the subject caught the ruler. The subjects wore headphones when they took the test for sight, a blindfold for the sound test, and both a blindfold and headphones for the touch test. To build my testing device, I used wood, pipe, doorbell devices, a transformer and wires.

Results
I rejected my hypothesis because my test results showed that the subjects reacted quicker using the sense of hearing. The lowest average test results (that is, the quickest reactions) came during sound testing with results averaging 11.63 centimeters. Second fastest was touch, which averaged 17.50 centimeters. Sight was last, averaging 24.16 centimeters.

Conclusions/Discussion
Overall, the results from testing all of the subjects were similar, but I was wrong in my estimate of which sense would produce the quickest reactions. Hearing produced the quickest reactions: 96.7% of people tested reacted most quickly relying on the sense of hearing. 86.7% of the subjects reacted more quickly when relying on the sense of touch, as compared to the sense of sight. This may have importance in a number of public safety applications such as the use of sounds for traffic warnings.

Summary Statement
My project tests whether there are differences in human reaction times when they are stimulated using the separate senses of sight, hearing and touch.

Help Received
Parents helped me gather materials and build the testing device and with graphs and board design.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Robyn N. Miles

Project Number
J0325

Project Title
Will Using Additional Stimuli to Reinforce Ten Words Enhance Short-Term Memory Recall?

Abstract

Objectives/Goals
My objective was to prove that using additional stimuli for reinforcement of word recall enhanced short-term memory. In my control group (test #1) I showed ten words to subjects who were within a specific age group. I showed the words one at a time for two seconds each. Subjects were given 30 seconds to recall and write down remembered words after all words were shown to them. I administered three other tests introducing additional stimuli to the control group test to determine if short-term memory recall could be improved.

Methods/Materials
Based on my research, I devised an experiment to learn whether people remembered more words if given test #1 - the control group, test #2 - ten words shown twice, test #3 - ten words shown once with complimentary pictures for reinforcement, test #4 - ten words shown while the words were said aloud to them. I used 40 different common nouns for my tests. I hypothesized results would be in order of most to least words remembered in the following order: Test #3, test #2, test #1, test #4.

Results
Some types of additional stimuli were helpful and resulted in more words remembered if it didn't interfere with the brain's primary sensory input of the word shown once. Test #2 - seeing the same word twice was most beneficial with an average of 61% of the possible words remembered. Test #3 - seeing a picture of the word was next with 59%. Test #1 - the control group of seeing the word once was third with 56%. Test #4 - seeing the word and hearing it at the same time actually detracted from memory recall ability with 51%.

Conclusions/Discussion
In an attempt to enhance short-term memory recall of ten words, using additional stimuli can either enhance or adversely affect ones ability to concentrate and recall words depending on the type of stimuli introduced. My experiment determined that the brain's complicated processes of short-term memory recall can be improved by introducing additional stimuli that reinforces memory recall. Additional stimuli, meant to improve recall, can be detrimental to the memory process if it causes confussion and loss of concentration during critical thought processes.

Summary Statement
My project was designed to determine through testing of subects if short-term memory can be enhanced by introducing additional stimuli to reinforce the memory process.

Help Received
In doing my project my mom took me to the library and bookstore so I could research my project. She also took me to various places so that I could conduct my experiments.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Julia C. Mizrahi

Project Number
J0326

Project Title
Auditory and Visual Short-Term Memory: Evaluation of Learning Strengths

Abstract

Objectives/Goals
The objective of this study is to determine whether high school seniors have better short-term memory when presented with stimuli in an exclusively visual presentation or in an exclusively auditory presentation.

Methods/Materials
Five random numbers were chosen and designated one of five positions on a piece of paper. These numbers and their locations were either read or visually presented, using PowerPoint, to groups of high school seniors. Two trials were conducted for each of the five classes for each of the 2 days alternating the mode of presentation.

Results
The average number of correct responses when the numbers were presented auditorily was 2.786, whereas when the numbers were presented visually the average number of correct responses was 3.349. When the numbers were presented auditorily 12% were not able to get four or five correct responses. When the numbers were presented visually 3% were not able to get any correct responses and 49% were able to recall four or five correct numbers.

Conclusions/Discussion
This study confirms the hypothesis that visual short-term memory appears to be stronger than auditory short-term memory. In general, students recalled more numbers and their designated position when they were presented visually rather than auditorily. The implication of this study is that teaching should include multiple modes of presentation including visual as well as auditory.

Summary Statement
When asked to recall five random numbers, students displayed better short-term memory when the numbers were presented visually rather than auditorily.

Help Received
Mrs. Marilyn Sniffen # Gate Science Advisor

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Dustin H. Philpott

Project Number
J0327

Project Title
How Sight Affects Your Taste

Abstract

Objectives/Goals
The objective is to determine if your sight has an effect on your taste.

Methods/Materials
I selected 30 volunteers that liked the taste of ketchup and were not color blind to taste three different colored ketchups made by the same company and had the same ingredients except added food colorings. I blind folded each volunteer taste tester and asked each to taste the three different colored ketchups, red, green, and purple, using french fries as my taste food. Each tester was asked which sauce they liked best, and if they could tell any difference in the taste of the ketchups. The blind fold was then removed and the tester was asked which sauce they would least like to eat. All answers were recorded.

Results
Most volunteer taste testers couldn't taste any difference between the sauces blind folded. Most volunteers choose the green colored ketchup as the one they liked best blind folded. When the blind fold was removed all tasters chose either the purple or the green that they would least like to eat.

Conclusions/Discussion
I concluded that most people tested couldn't tell any difference between the sauces while blind folded. When the blind fold was removed they were asked which color ketchup they would least like to eat. All testers chose either the purple or green colored ketchup. I concluded that it is because of our visual perception and recognition that we have been raised that ketchup is to be the color red.

Summary Statement
How your sight effects your taste.

Help Received
Science class, family and friends helped with taste testing, mother helped with research.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Marc L. Ponseggi

Project Number
J0328

Project Title
Pictures versus Words in Language Acquisition

Abstract

Objectives/Goals
There are several ways of teaching language. This experiment examined the use of verbal teaching versus using imagery. The hypothesis is that the use of imagery would enhance language acquisition more than verbal.

Methods/Materials
The experimenter created two study sheets for learning Latin vocabulary. One contained pictures with the Latin word for them above the pictures. The second study sheet contained those same Latin words with written translations/definitions in English. A test of ten words each with four possible answers in multiple choice format was created. A total 164 seventh grade students in 5 classes were chosen to participate in the experiment. The number who got the "picture" study sheets and the "written" study sheets were evenly divided. They were given 30 seconds to review their study sheet. Then the test was administered to them. The tests were corrected and the results were entered into a computer database. A statistical analysis was done.

Results
The results were that the average percent correct for those using the "picture" study sheets was 78.59 percent while the average percent correct for those using the "written" study sheets was 72.29 percent. This was statistically significant to 89.7 percent.

Conclusions/Discussion
Based on these results the hypothesis was accepted that imagery increased the acquisition of language a greater amount than verbal. According to this research, using images for teaching vocabulary is an improvement over verbal methods alone. In addition to studying the verbal definitions, teachers should have pictures in their study materials.

Summary Statement
This study examines the way students learn using two different visual methods.

Help Received
Father helped typing and teaching statistical analysis. Mrs. Soleway (my science teacher) helped in using the scantron machine

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Brian J. Robillard

Project Number
J0329

Project Title
To See or Not to See

Abstract

Objectives/Goals
I wanted to determine the range of response of differing human ages to the Stroop Effect. This would measure the discrete ability of people to focus on differnt things simultaneously.

Methods/Materials
For this test, I used human volunteers, a set of student created test strips with colored words to evaluate the response of people to the Stroop Effect, and a stopwatch.

Results
In my project, I discovered that the age of test subjects was significant in their response to the Stroop Effect. Twenty+ year old subjects exhibited the least effect, while subjects aged 12 and under showed the greatest response. Additionally, I found that males were able to complete the test more quickly, but females were more accurate.

Conclusions/Discussion
My experiment supported my hypothesis. I concluded that as people get older, they are more capable of concentrating on different things at the same time.

Summary Statement
The ability of people to differentiate between related cognitive functions.

Help Received
My mom assisted me with obtaining test subjects, my science fair advisor assisted me in selecting a topic and he proofread my project.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Emily A. Schlinz

Project Number
J0330

Project Title
Conditioned Response

Abstract

Objectives/Goals

I attempted to duplicate an early experiment of Dr. Ivan Pavlov pertaining to conditioned response. Modern research shows that by associating products with catchy music greatly enhances the product#s appeal. This is used in all sorts of advertising. I wanted to determine if my dog, Buddy, would salivate, upon hearing a song, after he had been conditioned to being fed while this song was playing. Step 2: Would he be able to distinguish his song from another song?

Methods/Materials

A music CD was made containing the #Lakers# Song#. The song was played, and at a certain point in the song, Buddy was fed. Buddy#s activity, response, and feeling moisture around his muzzle were recorded each time the music was played. A second music CD contained a new song followed by Buddy#s Lakers# Song. His reactions were observed and recorded

Results

After playing the Lakers# Song over a several day period, Buddy was conditioned to expect feeding when he heard this song. He became excited, tail wagging and salivating. When a new song was added, he did not react until the song finished and his Lakers# Song began to play. He was then very excited and salivated, showing he clearly recognized his song.

Conclusions/Discussion

My hypothesis was correct. The dog, Buddy, was able to develop a conditioned response to the music. When a second song was introduced, he was attentive, but did not react in the same manner as when his song was played. When the new song stopped and Buddy#s song began, he became excited and his muzzle was moist with saliva. About one minute into his song, he was very excited, knowing food was on the way.

Today, psychologists know how the brain absorbs information, first impact from images, second sound, third text. This information is very useful to advertisers and salesmen. A particular commercial shows a company#s sleek car being driven by very stylishly dressed, attractive young adults moving their bodies to the beat of very catchy music. The music causes people to relate to the images being presented, such as the shiny car driven by attractive, well-dressed young people. It is hoped that when people see one of these cars, they have good feelings about it due to the advertisement. Soft music is also used in touring model homes. Educated consumers should be aware they are being manipulated and not react only to their conditioned response to the sights and sounds presented to them.

Summary Statement

Can a dog develop a conditioned response to music, and if so, can he recognize different songs?

Help Received

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Christine R. Tanguay

Project Number
J0331

Project Title
Do You Believe What You See? The Effect of Lateral Adaptation on the Human Visual System

Abstract

Objectives/Goals
Is the effect of object size (field-of-view) on lateral adaptation in the human visual system the same or different for monochrome (grey scale) and color vision? My objective is to develop a better understanding of the contrast enhancement mechanisms of the human eye and brain, and in particular to understand the differences in behavior that occur in the color and grey-scale vision systems with respect to the size of the perceived objects within the field of view. Hypothesis: Lateral adaptation occurs in the human visual system, and results in contrast enhancement for same-brightness objects placed in different brightness backgrounds. Since the brain processes grey-scale and color information differently, and since the corresponding visual acuities are also different, we hypothesize that the minimum fields-of-view for grey-scale and color lateral adaptation may be different as well.

Methods/Materials
Several sets of visual test targets, generated in Matlab, and printed out in both grey-scale and color were used.
A. We made up patterns of various sizes both in grey-scale and in color, with different relative contrasts and colors between the square objects and their backgrounds.
B. The patterns were shown to 22 different human subjects, placed at different distances from each subject.
C. Each person#s observations were recorded as to how they perceived the brightness or color of each square when the patterns were presented at various distances from the observer.
D. The data were analyzed to determine the similarities and differences between the grey-scale and color image cases. Control patterns were used to eliminate observer bias.

Results
The grey-scale lateral brightness adaptation effect was observed over the entire range of object sizes and distances tested, right to the limit of human visual acuity. The chromatic adaptation (color) effect was observed over a nearly identical range of object sizes and distances tested.

Conclusions/Discussion
The minimum fields-of-view for grey-scale and color lateral adaptation are more similar than different, with both grey-scale and color adaptation working essentially all the way to the limits of human vision. This result is unexpected due to the traditional view of the specific mechanisms by which the brain processes grey-scale and color information, and where in the eye and the brain grey-scale and color information are extracted.

Summary Statement
In this project, we demonstrated that lateral brightness adaptation and chromatic adaptation can be observed to almost the limits of human visual acuity, contrary to the currently accepted models of the human eye and brain.

Help Received
Father guided student through project, offered suggestions and answered questions, and helped with the Matlab and PowerPoint programs to develop test targets and charts. Mother solicited volunteers to be experimental subjects, and helped with editing.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Gary R. Western

Project Number
J0332

Project Title
Music Tests Involving Digital Instruments

Abstract

Objectives/Goals
I wanted to see if the amount of a person's musical training and background affects their recognition of several different electronic musical instruments (MIDIs).

Methods/Materials
First, I created a MIDI (music file with computer-synthesized instruments) with two arpeggios (scales up and down) and copied it to make five MIDIs. I then changed each identical MIDI to a different musical instrument. I made a CD of these MIDIs and played them for 100 people. I made 100 copies of a survey with information such as, "How often do you listen to music?" Once they had finished with this section, there was another section with five blank lines where they would write what they thought each MIDI instrument was. I collected the surveys, tallied the information, and graphed it.

Results
As the data was graphed, I was very surprised. The number of people who listened to music the least and didn't play an instrument was much higher than the number of people with lots of musical background, therefore making up the majority of the correct answers.

Conclusions/Discussion
I believe that the people who listened to music more were expecting something that they knew about in music that others didn't, and therefore thought they heard something that wasn't there. The people without musical background might only hear what is there, not what they expect it to be.

Summary Statement
My project is about the effect of a person's musical background on electronic musical instrument recognition.

Help Received
My parents helped me come up with an idea and to proofread my work, and my science teacher gave suggestions on what to do next.

CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
Christopher A. Young

Project Number
J0333

Project Title
Who Can Follow the Yellow Road?

Abstract

Objectives/Goals
My hypothesis is that people will trace the star better and faster with their dominant hand and that left handers will trace the star better than right handers overall.

Methods/Materials
I tested 101 subjects age 11 and up, both male and female. I obtained informed consent from all subjects. The subjects looked in a mirror at the road an traced a star pattern. Each subject completed the star with their dominant and non-dominant hand and were timed.

Results
I tested 74 right handers and 27 left handers. The average age of the subjects tested was 33.2 years. The average time of right handers with their dominant hand was 93.4 seconds. The average time of left handers with their dominant hand was 102.4 seconds. The average time of right handers with their non-dominant hand was 63.3 seconds. The average time of left handers with their non-dominant hand was 68.9 seconds.

Conclusions/Discussion
The data shows that people did better with their non-dominant hand. The data also shows that right handers traced the star faster but left handers stayed in the lines more.

Summary Statement
Subjects were tested to determine their ability to trace a star while looking in a mirror.

Help Received
Mother helped with research; Father helped with testing subjects; Aunt helped with release form.