CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Matthew W. Alexander

Project Number
J0301

Project Title
Road Rage: Does Caffeine Fuel Your Tank?

Abstract

Objectives/Goals
The objective of this research study is to correlate caffeine use to self-reported aggressive driving habits typical of road rage behavior.

Methods/Materials
One hundred and twenty male and female subjects ranging in age from 16 to 79 years were surveyed utilizing a two-paged survey. Side one contained 14 statements about driving habits. Subjects were asked to respond to each statement utilizing a scale ranging from #Never# to #Always.# Side two of the survey contained seven demographics about the participant#s personal background along with five questions that asked the participant to quantify his/her caffeine consumption. One hundred fourteen surveys were completed and the results were analyzed. Data was then placed into graphs.

Results
Results of the survey reveal that caffeine intake greater than one serving per day increases the aggressive driving behaviors of subjects. Male drivers showed the highest aggressive driving behaviors overall. Male drivers who consumed greater than one serving of caffeine per day showed the greatest aggressive driving scores (27.55) as compared to females who consumed the same amounts of caffeine (22.17). The aggressive driving behaviors of females were not significantly different between those who consumed low levels of caffeine (22.10) and those who consumed large amounts of caffeine (23.00). However, male subjects who consumed high levels of caffeine use showed the most significant differences in aggressive driving behaviors (27.55) as compared to male subjects who consumed low levels of caffeine (22.17).

Conclusions/Discussion
The hypothesis of this study proved to be correct. Caffeine use did contribute to a subject#s self-reported aggressive driving behaviors typical of road rage. This was most evident in the male population surveyed.

Summary Statement
This project is about caffeine's effect on aggressive driving behaviors typical of road rage.

Help Received
None

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Jordan D. Bishop

Project Number
J0302

Project Title
Autism + Music = Relaxation

Abstract

Objectives/Goals
My objective is to find out what style of music has the most calming effect on a person with autism. My brother, who has autism, can get very wild and upset, and I want to know how to help him feel more calm.

Methods/Materials
Since my brother likes and responds to music, I explained my project and got his permission, then chose four styles of music for him to listen to. They were jazz, Rock & Roll, classical piano, and opera. I chose music he had never heard before so he wouldn't be used to them. I tested him at the same time each day. I played each piece 3 times over 3 days, for 5 minutes each. I made sure he sat in the same place, his surroundings were the same, that the music was played at the same volume,25, and that he was comfortable. (He had used the bathroom and wasn't hungry.)I charted his reactions by measuring how many times he vocalized, fidgeted, and got up, then I transfered the data on to line graphs, one for each type of music, showing each kind of reaction with a different colored line.

Results
My results show that opera had the most calming effect on him, causing him to lie down and almost fall asleep. During opera my brother stayed seated the full 5 minutes, quiet for a full 2 minutes and fidgeted mainly after 3 minutes had gone by.
Rock & roll caused almost the same amount of fidgeting as classical piano, however he was able to stay seated a full 3 minutes. Classical piano results showed the second highest vocal activity. During jazz, his fidgeting, vocalizing and inability to sit down occured more often than with any other style of music.

Conclusions/Discussion
Of the four styles of music I tested, opera had the most calming effect on a person with autism. It's possible that I got this result from opera because of the vocal music in it. I believe this is true because rock & roll which was the 2nd most calming, was the only other style of music I tested that had vocal parts. To do this project again, I would use more vocal music to test his reaction to voice.

Summary Statement
My project is about finding out how music can calm a person with autism.

Help Received
My mother helped me by bringing my brother back to the couch when he got up to run around. My mother also took pictures from where she was standing so I wouldn't distract him.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Catherine S. Boljen

Project Number
J0303

Project Title
Catch Me If You Can

Abstract

Objectives/Goals
To determine if elementary aged boys or girls have better eye-hand reflexes.

Methods/Materials
I would use a ruler marked with milliseconds per 1.27cm (half inch), drop it, and ask my participant to catch the ruler with their index finger and their thumb. They pinched their thumb and finger together when I drop it. I would do this five times, then take an average of their 5 scores. I tested 70 people, equal boys and girls.

Results
In my hypothesis, I thought elementary aged females would have better eye-hand reflexes. My results showed that boys did slightly better than the girls.

Conclusions/Discussion
I found that boys had quicker eye-hand reflexes than girls. An interesting conclusion also showed that people who played sports were the quickest.

To continue my study, I want to test more people, and try different controlled situations like: blindfold the students and just tel

Summary Statement
Is there a difference between eye-hand reflexes among elementary aged boys and girls

Help Received
Dad explained the formula: time=distance x 2 divided by gravity. My dad and sister helped cut out materials for the board.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Jordan Butler; Amir Haider

Project Number
J0304

Project Title
The Stroop Effect

Abstract

Objectives/Goals
We observed the effect of age and gender on an individual's performance on the the Stroop Color and Word Test

Methods/Materials
In our experiment, we tested four different age groups of both male and female from elementary school, middle school, high school, and senior citizens (age 60 and older). We used standardized Stroop Color and Word Test and administrated it to each subject. On the first page they were asked to read the name of 100 color names as fast as they can. On the second page they were asked to state the color as it appeared on the paper. On the third page the subject was asked to tell the color of the words and ignore what the word reads. They were given forty-five seconds for each test and their score was recorded.

Results
The results of our experiment indicated that the high school females scored the best on the entire Stroop Color and Word Test. However the results of high school females were not significantly different from high school males. Thus, leading us to believe that individuals of both genders tend to gradually improve their results on the Stroop Effect as they grow older. Another significant result was overall low score of older age males as well as females. Surprisingly, the elementary males did better than the females and the overall test results were similar to the test results of old age males and females.

Conclusions/Discussion
We discovered that Interference decreases as age and education grows, then it increases greatly in older test subjects

Summary Statement
Our test investigated age and gender's effect on the Stroop Color and Word Test.

Help Received
Mr and Mrs. Haider both explained the subject and helped provide information on the topic, Mr. and Mrs. Hoffman helped by giving wisdom and excellent advice and Mr. and Mrs. Butler helped with the setup of the board

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Anastasia F. Calciano

Project Number
J0305

Project Title
A Comparison of Perceptual Ability Using Manipulative Tasks in Children With and Without Dyslexia

Abstract

Objectives/Goals
Introduction Statement of Purpose: The purpose of this study is to determine whether children with dyslexia are able to perform a task that does not require reading or writing as well as or better than children without dyslexia. The reason for this exploration is that most academic learning is done through reading and writing. Perhaps in a alternative learning environment where for certain subjects these tasks are less emphasized and manipulative activities using patterns and shapes are dominant then dyslexic children have a better opportunity to succeed. I chose Tangrams as the manipulative activity because they can be used without reading or writing. Investigative Question: Can children with dyslexia perceive patterns and shapes by performing manipulative tasks as well if not better than children without dyslexia? Hypothesis: I believe that children with dyslexia can perceive patterns and shapes by performing manipulative tasks as well as children without dyslexia.

Methods/Materials
Activity: Each child will be given a series of three tangrams. Each tangram will become more difficult than the previous one. The child will be timed to see how long it takes to complete the tangram. The child will then be asked what the picture looks like to him. The child will then be allowed to arrange the tans anyway they wish and give it a name.

Results
TBA Currently compiling results.

Conclusions/Discussion
TBA Currently compiling results.

Summary Statement
The ability of children with dyslexia to do as well if not better than children without dyslexia doing a task that is about perceptual ability without reading or writing.

Help Received
Mrs. Carol Murphy, Licensed Speech Therapist

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Michelle M. Chatley

Project Number
J0306

Project Title
Color Codes

Abstract

Objectives/Goals
My objective was to determine if the color of print effects the ability to comprehend and retain the material.

Methods/Materials
Three passages, from the same book to ensure that each of the passages were of the same reading level were selected and printed in five different colors. The colors include black, red, blue, pink, and green. The passages were printed on white paper. Tests with the same level of difficulty were constructed for each of the three passages. Each test had five questions concerning that particular passage. Sixteen sixth graders were randomly selected to read all three passages and then complete the tests. The students had a maximum of five minutes to read the passage and complete the test.

Results
When I first looked at the tests, I noticed that red had the best test scores, and green had the worst scores. I thought about my results, then looked back at the tests. When I looked over them, I noticed that the difference wasn#t caused by the color, but by the reading level of the students. That#s when I realized, that the color of ink did not effect the test scores. The students reading ability was the main factor.

Conclusions/Discussion
My conclusion is that the color of ink, in which a reading test is taken does not affect the outcome. There are many possible reasons that there wasn#t a difference. One reason, could be the practice effect on black. We read black practically every time we read which could have caused the black and the colors to even out. Another possibility is that the colors irritated the eyes, causing the colors# test scores to decrease. I had a lot of fun doing my project and would definitely do another project similar to this one.

Summary Statement
To determine if the color of printing effects students# reading comprehension.

Help Received
My father helped me to come up with the topic and chart the results. My mother helped me to put the tests together and test the students. My classmates read the passages and took the tests during our lunch period.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Ryan M. Chung

Project Number
J0307

Project Title
Experience the Stroop! Does the Stroop Effect Change with Gender and Age?

Abstract

Objectives/Goals
The Stroop Test measures reaction time in identifying the color of the word versus reading the name of the color. The purpose of my science project is to test the Stroop Effect on gender and age. My hypothesis is that females will be quicker than males at completing the Stroop Test. Children will complete the Stroop Test the fastest out of young people and adults.

Methods/Materials
30 index cards with xxx written in different colors (Control Color)
30 index cards with the names of colors written in the same color ink (Control Word)
30 index cards with the names of colors written in different color ink (Say Color and Read Word)
Four different color and word tests (Control Color, Control Word, Say Color and Read Word) were conducted on 30 males and 30 females in three different age groups (ages 10-20, 21-40, 41-65) to measure reaction time after reading words or saying color on 30 index cards.

Results
In the gender category, the female group had a faster reaction time in all of the tests. Females were quicker at reacting to the Stroop Tests than the males. Age group 10-20 had the fastest reaction time in the control color, control word and say color tests. Age group 41-65 had the slowest reaction times. The Say Color test always had a longer reaction time than the Read Word test.

Conclusions/Discussion
Females and children were quicker at reacting to the Stroop Tests. Females may have an advantage in color recognition. People were much slower to recognize a color than to recognize a word because reading is automatic. Say Color clearly demonstrated the Stroop Effect because test subjects experienced interference in their brain when they saw an index card with a color word written in a different color. The interference slowed their brain down to focus on concentrating on saying the color.

Summary Statement
My science project is to test the Stroop Effect on gender and age.

Help Received
My mother assisted me in setting up the experiment. My little brother helped me during some of the experiment with the stopwatch.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Devyn A.M. Clester

Project Number
J0308

Project Title
Remember... What?

Abstract

Objectives/Goals
To determine who has superior short term memory, boys or girls between the ages of 11 to 14.

Methods/Materials
I first designing the short-term memory test devised of 20 random pictures. I set the test up by allowing the experimental subjects to view the random pictures for only 30 seconds. After that they would have to rely on their short-term memory to recall what they had just seen. I then set out to put the test in action. My goal was to have 100 girls and 100 boys take the test to determine who had superior short-term memory. I felt that a random sample of 200 children would be sufficient data to base my conclusion on. Therfore, my materials included 200 short-term memory test answer sheets, 10 short-term memory tests, 10 pens, a stop watch and of course 200 children.

Results
Girls averaged 9.87 pictures remembered
Boys averaged 7.52 pictures remembered

Conclusions/Discussion
Girls from the ages of 11 to 14, on the average, have superior short-term memory, compared to boys. Girls remembered 12% more pictures than boys. Although the pictures amount of viewing time, 30 seconds, remained constant, the location of where the randomly chosen 200 children varied. From the park, to the shopping center, to their homes, the results concluded that the surrounding environment didn't change the majority remembered pictures for boys and girls. Although girls did have superior short-term memory, on the average, the children only remembered half of the pictures presented.

Summary Statement
My project is to determine who has superior short-term memory, boys or girls, between the ages of 11 to 14.

Help Received
My mother took me to the varying locations to administer the experiments. She also helped me keep organized and helped with the title of the project.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Jordan M. Costigan

Project Number
J0309

Project Title
Men or Women: Who Remembers Better?

Abstract

Objectives/Goals
It is hypothesized that women between the ages of 20-40 will remember the best because they have the most priorities and responsibilities to attend to.
Research has shown that women would remember the best since they produce a female hormone called estrogen which promotes cell growth in the temporal lobe and promotes memory. Therefore, women would remember the best. Also short-term memory also know as the active system which only lets people remember usually 9 things for up to 20 seconds.

Methods/Materials
Materials: 2 Poster Boards, Scissors, Magazine/Computer, Glue, Paper for Survey, Pen/Pencil, Stopwatch, and Willing Participants (at least three of each age group for each gender)
Methods: 1) Cut various types of pictures (such as cars, fruit, planes, plants, people, etc#) from magazines or print out pictures from computers. Also use the computer to print out different numbers that are different in size. 2) Glue the pictures on one poster board and the numbers on the other poster board. 3) Find willing participants for the project. 4) Tell them to look at the poster board for 45 seconds and afterward give them a paper and a pen/pencil. Tell them to write what they remember. Remember they only get 2 minutes and 30 seconds to write the things down. 5) Tabulate the scores onto a chart or a table for analysis.

Results
The women aged 36-40 scored the best. The women did the best as predicted and showed that all the research and predictions were correct. The best scores for the men were the men aged from 46-50. Although the men came close the women won the right to say women are better, in memory.
Also shown in the results were, boys from the ages of 10#15 did the worst out of the men age groups and women aged from 56#over did the worst out of all the women age groups.

Conclusions/Discussion
The results supported my hypothesis because the highest ranked age group for the most correct answers was women at the ages of 36-40. They remembered at an average of 12 items for each test while everyone got a little lower.
Also shown in the test results boys at the ages of 10#15 scored the least and women at the ages 56#over scored the least. This shows that young and old people can have the same memory. It also shows that memory can increase and decrease over a lifetime.

Summary Statement
What is the effect of age and gender on short-term memory?

Help Received
My mom taught me how to do some of the computer formatting. My dad took me all over so we could complete the tests. My sister was my timekeeper to make sure that each participant completed the testing within the allotted times.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Seth B. Dunn

Project Number
J0310

Project Title
The Effects of Color on Human Depth Perception

Abstract

Objectives/Goals
The objective of my project was to see if color can effect how far you can see.

Methods/Materials
150 subjects were taken from a middle school (ages 12-14), and taken outside to see if they could see a colored whiteboard marker against a colored shirt.

Results
4/5 saw yellow against a black background at 200 feet away, averaging 197.5 feet viewing distance. Very few people could see black against black from far away.

Conclusions/Discussion
My results were an exact reflection of my hypothesis, as in they were the same. I found that certain colors can be seen farther or closer against backgrounds, and that while using colors, certain ones are bettor against certain backgrounds.

Summary Statement
My project shows that different colors can be seen bettor and worse against different background colors.

Help Received
Some subjects helped measure distance to markers.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Miriam C. Glicksberg

Project Number
J0311

Project Title
What Causes Absence of Relative Pitch?

Abstract

Objectives/Goals
Last year, I defined five singing phenotypes and discovered that impaired relative pitch (not knowing intervals between notes) in a singing test is likely to be inherited as an autosomal recessive trait. This year's project is aimed at determining what causes these differences in relative pitch abilities. I hypothesized that subjects with Lost-Key or Atonal phenotypes will have a measurable defect either in hearing or in encoding/retrieving relative pitch intervals (memory).

Methods/Materials
I devised tests to measure hearing (single notes) and relative pitch memory (three-note tunes) using a CD record of notes I played on an accordion. Thirty-five consenting individuals participated by listening to the single and triple note sequences and playing them back on an electronic keyboard. I measured sixty-nine notes per person on a chromatic tuner and converted these letter scores into number values, so I could tabulate the data and graph the results.

Results
Lost-Key subjects performed worse in the memory test than in the hearing test, and had more trouble with larger pitch intervals. Atonal subjects had the greatest memory defects compared to all other singing phenotypes. Interestingly, those participants with music lessons had better hearing than others in their group, which indicates that the sense of hearing might be trainable.

Conclusions/Discussion
While Atonal individuals have decreased ability to recognize single notes, their relative pitch memory impairment is much more prominent in causing their inability to sing.

Summary Statement
Inability to sing correlates with poor relative pitch memory, as assessed in a simple tune playback test.

Help Received
My mother drove me to the subjects' houses, bought me the equipment, and gave me tips in using Excel.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Alisa M. Goldrich

Project Number
J0312

Project Title
Does Cell Phone Usage Affect Reaction Time?

Abstract

Objectives/Goals
The objective of this project is to figure out if cell phone usage by a vehicle's driver affects his or her reaction time, thus impairing driver performance and compromising safety.

Methods/Materials
Reaction timer/car simulator. Chair (for subject) and table. Hand-held cell phone. Hands-free cell phone. 20 participants between ages of 20-50. Questions/topics to engage participants in conversation over the phone. Assistant to ask questions on cell phone. For my control, I tested each participant's reaction time with no cell phone. Then I would test their reaction time with hand-held and hands-free cell phones. Three trials for each and then I would record their times and find the average.

Results
All participants' reaction time was impaired by usage of hand-held and hands-free cell phones as compared to when no cell phone was being used. Reaction time took longer with hand-held than hands-free cell phones.

Conclusions/Discussion
Cell phone usage adds to a driver's reaction time. A person's nervous system cannot concentrate both on the road and on a conversation with full attention. This is significant in that the slightest impairment of a driver's ability can lead to accidents or even death. This conclusion is in line with my original hypothesis.

Summary Statement
This project is designed to determine if cell phone usage impairs a driver's ability and jeopardizes safety.

Help Received
My mom borrowed the reaction timer/car simulator from her clinic. My parents helped me find 20 participants between the ages of 20 and 50 years old. My mom servied as an assistant to engage particpants in conversation on the cell phone.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Amol K. Gupta

Project Number
J0313

Project Title
Stress Without Distress

Abstract

Objectives/Goals
The goal for the project is to find a solution to stress. I compared the effects of Yogic relaxation (Deep Relaxation Technique) to that of Music, and Nap on one#s Blood Pressure, Heart Rate, and Respiratory Rate. These factors are a tool to measure the level of stress. Nap relaxation will act as the control group for this experiment. I believe that yogic relaxation would prove to be the most effective as it is known to relax your body as well as mind.

Methods/Materials
Three different groups consisting of 183 subjects were taken over a 4-month period. I recorded my voice for the 12 min. procedure for DRT. I used a classical music tape for the music. I used a watch to measure the respiratory rate and blood pressure monitors to measure blood pressure and heart rate.
Group #1-Yoga Practioners: This group consisted of 23 subjects, both hypertension and normal, who have been doing yoga for 2 or more years. They underwent yogic relaxation and nap relaxation.
Group #2-Normal Subjects (Non-Hypertensive, Non-Yoga): This group consisted of 100 subjects who had no history of hypertension or yoga. They underwent all three experiments.
Group #3- Hypertension Patients (Non-Yoga): This group consisted of 60 hypertensive patients. They underwent this experiment at a local cardiologist#s office. They were divided into three groups; each group of 20 did music relaxation, nap relaxation, and DRT relaxation separately.

Results
Group #1- Yoga Practioners: In the nap study, the systolic blood pressure decreased, the diastolic blood pressure increased as did the pulse and respiratory rate. In the yogic relaxation all four factors decreased significantly.
Group #2-Normal Subjects: For music as well as for nap, all four of the above factors decreased. For yoga, the decrease in the four factors was much more significant.
Group #3- Hypertension Patients: In the music study all four factors decreased as was seen in the nap study. In the yogic study, all of the factors decreased to a greater extent than in the other groups.

Conclusions/Discussion
My hypothesis was correct. Yogic relaxation led to the largest decrease in the 4 afore-mentioned factors in all the three groups. Yogic relaxation has thus proved to have reduced stress greatly. Doing DRT (yogic relaxation) is not only beneficial to those who have hypertension, but also helps normal people who constantly carry the load of stress.

Summary Statement
In my project I am testing the level of stress reduction on Yoga Practioners, Cardiac Patients, and Normal Subjects using Music, Nap, and Yoga.

Help Received
Dr. Kumar helped me in letting me do my project on his cardiac patients, Dr. Gupta helped clarify my knowledge on this subject, and my brother helped in teaching me Microsoft Excel on which I did my Data.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Jordan Hallstrom; Chase Jones

Project Number
J0314

Project Title
Righty Tighty, Lefty Loosey

Abstract

Objectives/Goals
Our goal was to find out if right-handed children wrote more legibly than left-handed children.

Methods/Materials
We tested a total of 292 students aged 8-11 years using a test paragraph and survey form. 23 students were disqualified. Of the remaining 269 students, 30 were left-handed. We matched the 30 left-handed students with grade/age/sex appropriate randomly selected right-handed students. The 60 survey forms were then given to a 3rd grade Language Arts teacher to be evaluated using the "Writing Report Card."

Results
30 test subjects were left-handed, which figured out to approximately 10% of the total test population. Of the 30 left-handed subjects, 60% or 18 subjects were male, and 40% or 12 were female. Left-handers received 3 "Illegible", 8 "Poor", 14 "Okay", and 5 "Good" ratings. The average point rating for right-handers was 2.97, while left-handers point average was 2.7.

Conclusions/Discussion
Through our experiment we found that right-handed subjects had writing which was more legible than left-handed subjects. We also noted that of the 60 qualifying subjects, the three "Illegible" ratings belonged to three 10-year-old, left-handed males. The only "Excellent" rating belonged to an eight-year-old female.

Summary Statement
Our project is about writing legibility and its relationship to left- and right-handedness.

Help Received
Mrs. Hernandez helped us by evaluating the writing of the 60 test subjects. Our moms helped us with typing and board set-up.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Julie A. Hicks

Project Number
J0315

Project Title
Can We Talk? Comparing Electronic-Larynx and Tracheoesophageal Speech

Abstract

Objectives/Goals
The purpose of my study was to determine which method of speech was better understood by the "average" person: electronic-larynx (EL) or tracheoesophageal prosthesis (TE) speech.

Methods/Materials
I made a digital recording of a male (electronic-larynx) and female (TE prosthesis) speaker as they read aloud twelve words and phrases from a speech intelligibility test. Next, I randomly selected one hundred males and female subjects ages twelve years and up. Each subject listened to the digital recording and wrote down the words and phrases that they heard. Responses were marked correct or incorrect.

Results
I found that there was no significant difference between how well my subjects understood either speaker on the words section of my test. Both speakers were very difficult to understand. However, my data showed a significant difference on the phrases section. The subjects were able to understand the TE speaker using phrases better than the EL speaker at a confidence level of 90%.

Conclusions/Discussion
My conclusion is that my data and statistics supported my hypothesis that the TE speaker would be better understood than the EL speaker. Because communication is essential to our daily lives, my project taught me that it is important for laryngectomees to be understood no matter how they communicate.

Summary Statement
I compared how well "average" people understood two methods of speaking commonly used by individuals who have had their larynx removed due to cancer.

Help Received
Laryngectomee speakers volunteered from the San Diego New Voice Club; Katrina Jenson (speech pathologist , SD VA Hospital) helped with project suggestions and loaned me a voice prosthesis; Dad helped with statistics;

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Melissa K. Hoffman

Project Number
J0316

Project Title
Being Broad Minded: Effects of Size of Angle and Apparent Depth on the Ponzo Illusion

Abstract

Objectives/Goals
In the Ponzo illusion, the angle of converging lines in the background creates apparent depth through linear perspective, causing people to see two equal, horizontal lines in the foreground as different sizes. I hypothesized that most people should see the illusion at moderate angles of perspective when apparent depth would be strong and few would see the illusion as the converging lines reach 0 or 180 degrees because the vanishing point effect should gradually disappear.

Methods/Materials
A total of 92 test subjects were shown Ponzo illusions where the angle of the converging lines increased in ten-degree steps from 0 to 180 degrees. Subjects were asked to determine whether the test line (upper horizontal line) appeared to be larger, smaller, or equal to the reference line (lower horizontal line). Controls were similar to tests but the diagrams had no converging lines as depth cues.

Results
At 10 degrees most (80%) test subjects saw the illusion and almost all test subjects (97% to 99%) identified the test line as larger through 110 degrees. Fewer than 5% saw the illusion when the test angles were greater than 120 degrees. No illusion was seen by any test subject at angles of 0 and 180 degrees. By comparison, all controls tested 100% correctly. Thus, the Ponzo illusion was seen to work over a broad, 100-degree range of angles for the converging lines.

Conclusions/Discussion
The data supports the ideas investigated here and by other scientists that depth cues are responsible for creating the illusion. Specifically, our ability to correctly identify the size of an object near and far (size constancy) makes the top horizontal appear far away and therefore larger. However, previous studies did not test over a broad range of angles, and this experiment suggests it would be good to do so to better understand the role linear perspective plays in creating apparent depth. We take for granted the ability to see the world in three dimensions and to perceive distance as a normal activity but depth perception is clearly complex.

Summary Statement
I demonstrated that the Ponzo illusion works over a broad, 100-degree range of angles where apparent depth is caused by misleading cues in linear perception.

Help Received
Father took me to UC Berkeley and Stanford to find original scientific citations; Mother proof-read paper; Parents got permission to give tests at workplace; 7th grade Science Teacher provided general supervision.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Brooke M. Hollyfield

Project Number
J0317

Project Title
Do People Know Their Learning Strengths?

Abstract

Objectives/Goals
For my science experiment, I chose to pursue the topic of studying humans# learning strengths. I wanted to see that if I asked what type of learner people thought they were and then gave a test that determined learning strengths, would their responses match or contradict.

Methods/Materials
I created a test to demonstrate peoples# learning strengths. I created random sequences of numbers starting from three to fifteen numbers. To perform the test, I took a volunteer into a quiet environment and gave them an explanation of the test. I gave each person two tests; the first one was to test for visual strength and the second to test for auditory strengths. After, I asked the volunteer the type of learner they thought they were. I compared their score with their response.

Results
Out of the fifty people I tested, 78% responded as visual learners, 12% as auditory, and 10% as equal. After the same group of people was given a test that determined learning strengths, 68% tested as visual, 12% auditory, and 20% as equal. I calculated the magnitude of error by subtracting the volunteer#s highest and lowest score. This was to determine how much their scores contradicted. Scores that had larger differences had higher magnitudes of error because they were not as close to matching their score as someone who contradicted by only a small amount. The highest magnitude of error was in the people who responded as equal and their test results contradicted. The lowest magnitude of error was people who responded as visual but test results contradicted.

Conclusions/Discussion
From my results, I conclude that more people are visual learners. I think that this is because of how our society revolves around visual things, the way we communicate, show dignity, and the world environment is visual. I was quite surprised of my findings. I realized that my hypothesis was incorrect. More of the volunteers# responses matched their test results. Also, more than half of my volunteers tested as visual learners. I found it interesting that none of the auditory learner#s responses matched their test results. I think it is a result of a visually based life that could lead them to believe this. The people I tested could have influenced my results. For further study it would be interesting to see if when given a choice for a learning style, if people would actually learn better than with the learning styles I could provide.

Summary Statement
In my project, I wanted to see if I asked people what type of learner they were if their responces would match or contradict the results of a test that determined type of learner.

Help Received
Deanna Ceballos- school psychologist who helped develop test, Elizabeth Lillja- helped interpret data.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Wesley F. Jacoby

Project Number
J0318

Project Title
Left in a Right-Handed World: The Acquisition of Ambidexterity

Abstract

Objectives/Goals
To determine if left-handed people become more ambidextrous than right-handed people due to their need to adapt to our right-handed world.

Methods/Materials
Twenty subjects of varying ages, ten right-handed and ten left-handed, completed an assembly task using both their dominant and non-dominant hands. The assembly task consisted of a pegboard with 15 holes, 15 golf tees, 15 metal nuts, 15 wooden beads, and 30 metal washers. These materials were placed into each hole in a specific pattern using only one hand. The subjects were timed until all 15 holes were completed. After one hand was done, the participants repeated the exact task using their other hand. To prevent a learning curve, the first participant started with their dominant hand and then used their non-dominant hand. The next person started with their non-dominant hand and then finished with their dominant hand. This pattern continued throughout the testing. The amount of ambidexterity a person showed was determined by the amount of time difference between completing the task with their dominant and non-dominant hand.

Results
Results initially showed that right-handed subjects, on an average, were slightly more ambidextrous than left-handed subjects by .04 seconds. When the data was broken down by age groups, it showed that the right-handed children were more ambidextrous than the left-handed children by 2.44 seconds, but left-handed adults were more ambidextrous than right-handed adults by 8.5 seconds. This suggested that left-handed people are more ambidextrous than right-handed people, but it takes a period of time to acquire their ambidexterity.

Conclusions/Discussion
The overall average shows the right-handed participants being slightly more ambidextrous than the left-handed participants. However, the data suggests that left-handed people are really more ambidextrous than right-handed people, but their ambidexterity develops over a period of time. Becoming ambidextrous then would be a result of left-handed people adapting their behaviors to our right-handed world. A larger sample of subjects with correlating ages would be necessary to prove the suggested trend that left-handed ambidexterity directly increases with age.

Summary Statement
Left-handed people become more ambidextrous than right-handed people over a period of time due to their adaptation of tasks in a right-handed world.

Help Received
Mother helped type.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Abhishek Jairam

Project Number
J0319

Project Title
Cell Phone Distractions

Abstract

Objectives/Goals
Cell phones are widely used everywhere. Many people are concerned about people getting into accidents while driving using cell phones. Some web research shows that accidents can increase with cell phones. The goal of my experiment is to see if distractions can occur with cell phone audio interactions and the extent to which people can make mistakes while on cell phones.

Methods/Materials
I conducted two types of hand-eye coordination tests. One is a simple test, to represent simple driving situations. Another a complex test, to reflect more complex driving conditions where quick thinking, and hand-eye coordination is involved. In the simple test, test subject picked the same colored token as shown by the index card I showed and placed it in the corresponding colored cup. In the complex test, he or she picked the missing colored token (since i showed 3 colors in the index card, he had to find the missing fourth)and placed it in the corresponding colored cup.

I conducted both the tests with and without audio interaction to see the effect of audio interaction on the mistakes made in correctly placing the colored tokens. Each test was timed, with audio interaction in the form of pre-recorded questions to which test subjects had to respond to as they took the visual/hand coordination test.

Results
29 people were tested. In all cases people made more mistakes in hand-eye coordination when audio interaction was introduced. Female group made less mistakes in comparison with male group. Young adults made less mistakes compared to adults. Mistakes generally increased by 15% to 30% when audio interaction occured while doing the hand-eye coordination test.

Conclusions/Discussion
I conclude that audio input and interactions clearly distract people and can cause mistakes to occur. My hypothesis is thus correct.

Females appear to make less mistakes than males because they may be better at multi-tasking. Young adults appear to make less mistakes because they are used to blasting music while they drive and have faster reaction times because they play lots of video games.

Summary Statement
My project is about how cell phone conversations causes distractions and increases the mistakes people make, especially when driving.

Help Received
My Dad tought me to use Microsoft Excel. My Mom helped me with the applications and buying all materials.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Michael J. Landau

Project Number
J0320

Project Title
Are Eyewitness Testimonies Accurate?

Abstract

Objectives/Goals
This project was conducted to determine the effects of suggestions on eyewitness reports.

Methods/Materials
Sixty subjects were used, twenty in each of three conditions (N=60). Thirty-one boys and 29 girls participated, ranging from grades K-5. Subjects viewed a 15 second video created by the investigator. The video showed two people playing catch with a football. A third person came into view of the camera, knocked down one of the original two, caught the ball, and ran off with it. All subjects were shown the same scene. In the Playing Catch Condition, subjects were told that, #some friends were going to be playing catch.# In the Theft Condition, the subjects were told that #something bad is going to happen.# In the Control Condition, subjects were not told anything specific about what was in the video; they were not given any suggestions. Subjects were given a set of questions created by the investigator, to assess the impact of the video.

Results
It was found that those in the Theft Condition were most likely to perceive that a crime had occurred in the scene. They also reported that the person who fell down did so as a result of being intentionally knocked down. Those in the Playing Catch Condition perceived it more as friends playing together and that nothing #bad# happened.

Conclusions/Discussion
This supports the hypothesis that suggestions do affect eyewitness reports. Subjects were able to accurately identify specifically observed events, such as the number of actors playing catch and the type of ball that was used. The results of the #playing catch# situation however were influenced by the suggestions that were given.

Summary Statement
I INVESTIGATED HOW SUGGESTIONS CAN EFFECT AN EYEWITNESS REPORT

Help Received
MRS. ARMOUR REVIEWED THE PROJECT; MY FATHER READ OVER MY RESULTS AND CONCLUSIONS; AND MY MOTHER HELPED ME TO PUT TOGETHER MY BOARD.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Mara O. Luevano

Project Number
J0321

Project Title
Hidden Messages

Abstract

Objectives/Goals
My goal is to find out if subliminal messages can effect a person's choice and does it affect gender.

Methods/Materials
For my expeiment, I needed 50 flash cards, M&M's, a bowl, and pictures. First, I placed 50 pictures cut out of magazines randomly, and glued them on to 50 flash cards. I made two groups of people both containing 14 people(7 girls, 7 boys). One group(group A) of people looked at 25 flash cards with a hidden message. The hidden message was the word "blue". After showing them the cards, they were each instucted to pick 2 M&M's out of five different colors(2 green,2 yellow, 2 blue, 2 orange, and 2 red). Seeing the word "blue" would want to make them pick more blue M&M's. The other group(group B) did the same thing, except they saw 25 flash cards with no hidden message. If the group who saw the hidden message picked more blue M&M's than the other group, it would prove my hypothesis. To see if it differs by gender I compared the boys and girls in group A

Results
Group A picked 17 Blue, 7 red, 2 yellow, 0 green, and 2 orange M&M's out of 28 possibilities.
Group B picked 11 blue, 7 orange, 4 green, 3 yellow, and 3 red M&M's out of 28 possibilities.
In goup A, the ratio of boys to girls who picked blue M&M's was 8:9.

Conclusions/Discussion
I've discovered that subliminal messages do have an effect on a person's choice. Even though the girls had higher number than the boy's by one, it is not a big enough of a difference to say that subliminal messages affect gender.

Summary Statement
If subliminal messages can affect a person's choice and can it affect gender.

Help Received
My mom helped type research and my dad helped with glueing things on to my board.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Alex P. Mandel

Project Number
J0322

Project Title
The Effect of the Perceived Fun of Various Activities on Time Perception

Abstract

Objectives/Goals
The purpose of this study was to determine if the perception of time changes depending on what a person is doing and whether or not they perceive the activity as fun. My hypothesis was that time will seem to pass more quickly for people engaged in activities they perceive as fun.

Methods/Materials
I gave 83 fourth and fifth graders four different activities: alphabetizing, catching Styrofoam puffs in cups, translating words into code, and long division. I timed each activity for 1 minute 22 seconds and asked the students to write down how much time they thought had gone by each time. I then asked them to rate the activities "lots of fun," "sort of fun," "neutral," "not very fun," or "not at all fun."

Results
For the activities rated very fun, 43% of the time estimates were less than the real time and 57% of the guesses were more. For the activities rated not fun at all, 41% of the time estimates were less than the real time and 59% were more. For all of the activities ranging from very fun to not fun at all, the majority of people thought more time had gone by than actually had (time dragged).

Conclusions/Discussion
My hypothesis that time seems to pass more quickly when you're having fun was not correct. For all of the activities ranging from very fun to not fun at all, the majority of people thought more time had gone by than actually had (time dragged). Many of the time estimates were so far off that I thought that perhaps fourth and fifth graders are not very good at determining time intervals and might not be the best subjects for this type of experiment. In future studies I would use an older population.

Summary Statement
This project was designed to determine if a person's perception of time changes depending on what the person is doing and whether or not they perceive the activity as fun.

Help Received
My mother helped me format my questionnaires and helped me enter my data into Excel. She also proofread my writing and drove me to school to do the experiments. Three teachers let me use the students in their classes as subjects. My brother helped me produce a graph from Excel.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Maya B. Mathur

Project Number
J0323

Project Title
The Differential Effects of Visual vs. Auditory Distractions on Memory

Abstract

Objectives/Goals
The purpose was to investigate how performance in an auditory memory task is affected by visual and auditory distractions

Methods/Materials
A random series of letters was read aloud to the subject, who then either read or listened to another series of letters before being asked to recall the original series. The number of characters recalled correctly was recorded and analyzed statistically. (No special materials were required.)

Results
This study progressed in three stages: (1) Preliminary experiments determined that an optimal test stimulus for further memory testing would be a series of 12 letters. (2) When the effect of distraction was compared for all subjects grouped together, visual and auditory distractions seemed about equally effective. However, when the effect of both modes of distractions were compared in individual subjects, it was evident that some people were especially sensitive to one mode or the other. (3) This result lead me to investigate whether enhanced sensitivity to particular modes of distraction in some individuals might be related to deeper differences in cognition. Initial studies suggest that people who have demonstrated a definite predisposition toward visual tasks in their lives (professional visual artists) may be more sensitive to visual distraction than to auditory distraction.

Conclusions/Discussion
Contrary to my hypothesis, visual and auditory distractions were about equally effective in most subjects. This leads me to speculate that memory for auditory stimuli may occur in areas of the brain where those sensory inputs are more equally intermixed than they are in primary auditory cortex (for example, secondary association cortex). The observation that some people were especially sensitive to one mode of distraction or the other suggests that, in addition to the widely accepted idea of visual and auditory "learners," some people may also be visual or auditory "distractees." Mode of distractibility may be related to a person#s fundamental cognitive "style." This may be an important factor to consider in designing teaching strategies.

Summary Statement
This study shows that for most people, visual and auditory distractions had a similar effect on memory performance, but that certain individuals like artists may be especially sensitive to one mode of distraction.

Help Received
This study was my original idea and I performed the experiments and analyses on my own. My mother taught me how to use Microsoft PowerPoint software to create graphs.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Joseph A. Mazeika

Project Number
J0324

Project Title
Racing for the Answer: The Effects of Video Games on Concentration

Abstract

Objectives/Goals
I tested the effects of video games on an elemetary student's ability to concentrate. My hypothesis was that of five different categories of video games, the "action" category would have the greatest negative impact on the concentration.

Methods/Materials
To test these effects, I had each student take a test of 100 math problems, and then a test of 15 definitions, each of which lasted 5 minutes. The second test revolved around looking up the words given in a dictionary. (See appendix A for tests) Afterwards, each child played the video game of their choice for 30 minutes, and immediately afterwards took two tests comparable to the previous ones, still only lasting five minutes.

Results
After analizing my data, I discovered that most (34 out of 50) of the students' math scores increased regardless of genre. Vocabulary scores, however, decreased or stayed the same. The "action" category overall, fell in the middle. The "adventure" catagory had the worst scores. The "racing" had the best overall average scores.

Conclusions/Discussion
In the end, my hypothesis was incorrect. Not only was the "action" catagory not the worst overall, on average the math scores rose overall. I had predicted that the scores would drop overall, on both tests. I figured that the "action" video games would have the worst scores, because of the high levels of violence. I believe that the "adventure" genre had the lowest scores because the games do not reward concentration as much as the others do.

Summary Statement
My project was testing how playing video games would affect an elementary student's ability to concentrate on school work.

Help Received
Mother drove to elementary school; School provided game systems

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Seth S. McCormick

Project Number
J0325

Project Title
Does Practice Make Perfect? The Effect of Athletic Participation on Depth Perception

Abstract

Objectives/Goals
The objective is to determine if athletic participation in sports which reward good depth perception improves depth perception.

Methods/Materials
Informed consent was obtained from 41 8th grade girls and boys, ages 13 and 14. A questionnaire on demographic characteristics and athletic history was filled out by all subjects. The distance between each subject's eyes was measured with a clear 6 inch ruler. Subjects were then trained to recognize measures of distance and size by observation of a three foot ruler laid on the ground. The test materials consisted of a 3 inch cube and a 6 inch cube spaced three feet apart at a distance of 12 and 15 feet away from the subjects. Each subject was asked to estimate the distance to the first cube and between the two cubes as well as the sizes of the two cubes. Subjects were then instructed to close their eyes. During this time the position of the two cubes was swapped. Then subjects opened their eyes and repeated the estimation procedure. Half the subjects started with the 3 inch cube closer, and the other half started with the 6 inch cube closer. Data were then analyzed.

Results
First and second trials achieved indistinguishable results, so only first trials were used for data analysis. There were small, statistically insignificant differences between the estimates of distance and size made by boys and girls; boys were more accurate. Female athletes estimated both size and distance better than non-athletes; male athletes guessed only size better than non-athletes. Analysis using both subjects' race and the distance between their eyes produced random results. Most surprisingly, the subjects underestimated the 12 ft. distance in 71 out of 82 trials, and overestimated in only 1.

Conclusions/Discussion
I had three hypotheses: 1. boys would do better than girls 2. subjects who participate in athletics would do better than non-participants 3. subjects with greater distance between their eyes would do better. The first two hypotheses were only weakly supported, while the third was not supported at all. This research indicates that practicing depth perception through sports makes only a minimal improvement in depth perception. The most significant and surprising result was that in 86.6% of the trials, subjects underestimated the distance to the closer cube, and overestimated in only 1.2%. This would be a good topic for subsequent exploration.

Summary Statement
My project demonstrated that depth perception is not improved by participation in sports which allow the participants to practice depth perception.

Help Received
Mother helped edit report. Father glued pages onto display board.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Caitlin M. Mercado

Project Number
J0326

Project Title
Is There a Strong Correlation between a Student's Motivation and Achievement at Their Ability Level?

Abstract

Objectives/Goals
The purpose of this project is to determine if there is a strong correlation between a student#s motivation and their achievement at their ability level.

Methods/Materials
(1) Choose students to test (2) Administer Self-motivation survey (3) Gather CAT6 scores for tested students (4) Gather GPA#s for tested students (5) Determine achievement levels for students (6) Determine students ability (7) Determine students motivation (8) Evaluate students motivation to students achievement at ability level.

Results
Preliminary results indicate that students with a high motivation could have lower achievement grades in school because of low motivation. Also, it showed that as a child#s motivation went up their ability to perform increased by 6%. Children with low ability levels were also excelling children with high ability levels because of this 6% increase in achievement.

Conclusions/Discussion
A student#s ability did not affect how they performed but their motivation did. The average of the students tested, motivation brought their ability to perform up 6%. I believe that a child with high ability may be receiving a "D" in school or even a grade as low as an "F" because of lack of motivation from peers, self, and family. Also, I think the older children get the more motivation affects their achievement in school. Even though, behavioral problems was not directly part of my project I think that they do cause more intelligent children to get lower grades then they should.

Summary Statement
The purpose of this project is to determine if there is a strong correlation between a student#s motivation and their achievement at their ability level.

Help Received
Miss Kutzner helped me with motivation studies. She also gathered scores that I could not get due to confidentiality.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Tommy R. Mullin

Project Number
J0327

Project Title
Development of Conservation of Liquid in Preschool Children

Abstract

Objectives/Goals
The objective of this project is to determine whether children are beginning to develop a sense of conservation of liquid during the age range of 3, 4 and 5 years.

Methods/Materials
Thirty children participated in this project: ten 3 year olds, ten 4 year olds and ten 5 year olds. Each child was presented with two identical, clear glass containers. An equal volume of blue water was poured into each. The child was asked to determine whether each glass has the same volume, or whether one has more. Then the child watched as one of these containers of blue water was poured into a third container which was also clear glass, but was much taller and thinner than the original pair. The tall, thin container of blue water was compared to the original container of blue water, which was shorter and wider. The child was asked to determine whether this new pair has the same volume, or whether one has more.

Results
Data for the three age groups fell into two categories: overall scores (comparing equal volumes of liquid in identical containers) and conservation scores (comparing equal volumes of liquid in containers of different shapes). On overall scores, 4 year olds were slightly higher than 3 year olds and 5 year olds were very significantly higher than 4 year olds or 3 year olds. On conservation scores, 3 year olds and 4 year olds were identical, while 5 year olds were slightly higher than the younger groups.

Conclusions/Discussion
Data shows that the ability to judge same or different is not the same as the ability to recognize that the volume of liquid remains the same when it is transferred into a container of different size and shape. The data shows that judging same or different is clearly developing between ages 4 and 5. However, data suggests that, although conservation of volume of liquid is slightly stronger in 5 year olds, none of these groups have fully achieved that ability. Therefore, the hypothesis is rejected. Further research comparing 5 year olds, 6 year olds and 7 year olds is recommended.

Summary Statement
My project was to investigate when preschool children begin to get the idea of conservation of volume of liquid.

Help Received
My father helped me with the statistics, the graphs and thinking about the results. My mother helped me research the paper. My science teacher guided me with the write-up process and scientific method. My former prechool teacher helped me recruit my subjects.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Julienne Nunn; Chelsi Stone

Project Number
J0328

Project Title
Spell M-O-D-A-L-I-T-Y: Does Learning Style Affect a Child's Ability to Spell Accurately?

Abstract

Objectives/Goals
We tested to see if a person#s learning modality (style)#visual (V), auditory (A), kinesthetic (K)#affects their spelling scores. We did research at the USC library and found information on spelling and modality.

Methods/Materials
We tested 40 third graders, 20 from public school and 20 from private school. We first gave subjects a questionnaire that we created (based on other questionnaires we have been given) to determine their modality. After we conducted the modality-determining test, we gave each subject 3 modality-specific spelling tests. We then scored the tests to see if subjects performed better in the test which matched their learning modality.

Results
We didn#t have sufficient auditory or kinesthetic subjects in our testing, and we think it affected our statistical results. There was no significant difference between subjects taking modality-specific spelling tests and non modality-specific spelling tests. However, according to a t-test, all types of learners performed significantly better on the kinesthetic tests.

Conclusions/Discussion
In conclusion, we found that a 3rd grader learns best when moving and doing as opposed to listening to or watching. We think that if we had had more time and more subjects that were auditory and kinesthetic, it would have given us more solid results.

Summary Statement
Does learning style affect a child's ability to spell accurately?

Help Received
Used library at USC library

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Vahakn Papazian

Project Number
J0329

Project Title
The Effect of Ready-Made Illustrated Stories on Working Memory

Abstract

Objectives/Goals
It is well-known that you can remember a set of words or ideas better by making up a story around them. My objective was to test the hypothesis that illustrated stories help you remember word sequences better even if the stories are not yours.

Methods/Materials
I randomly picked two sets of 10 nouns and made illustrated stories using them. I made web-based tests showing words in one set for 3 seconds each, and the other set as a 30 second illustrated story. After seeing each set, subjects typed the words from memory. I also made control tests using just pictures from the story, or just sentences. 202 people took the tests.

Results
People (especially women and under-20-year-olds) remembered words as well as their sequences significantly better when they were shown illustrated stories instead of just text, pictures or sentences. There was an average improvement of 17% in remembering the words and 29% in remembering them in the right sequence. But the small number of people who did very well on the text-only tests actually did worse with the illustrated stories.

Conclusions/Discussion
I think people did better on the illustrated stories because you can enjoy a story and that helps you remember it. The story ties all the words together in one package and you can remember that one package instead of remembering all the words separately. The illustrated stories helped people remember the words in the right sequence because there is a logical order in the story.

Summary Statement
Sure you can remember things better if you make up a story and images, but this project shows that if someone gives you an illustrated story that they made up, not you, that still a big help in remembering things.

Help Received
My dad gave me advice, made the database for the web-based test, and helped me with the wording for my report.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Lara S. Pede

Project Number
J0330

Project Title
Vicarious Learning: For Humans Only?

Abstract

Objectives/Goals
The goal of this project is to decide whether dogs could learn vicariously, that is, if dogs could learn to perform a task correctly faster if they watch another dog perform the task first.

Methods/Materials
In this experiment, two objects, a rectangular box and a blue cup, were placed a few feet away from the pair of dogs being tested. A treat was placed inside the box. The "model dog", the dog that performs the task first, was released. If they went to the box, they were rewarded with the small treat; if they went to the cup, nothing happened. This procedure was repeated until 15 tests' worth of data is collected. Then the "observer dog" was released, and the data was recorded. A timer was also used, only to tell if the dog went to the object quickly, which might signify that the dog was confident with his/her choice of objects, or if they went slowly, which might mean that the dog did not really know which object to go to.

Results
Overall, the model dogs went to the correct object in 104 out of 130 trials (80% of the time), while the observers went to the correct object in 117 trials out of 130 (90% of the time).

Conclusions/Discussion
In conclusion, the observer dogs went to the correct object in more experiments than the models did. This shows that dogs do learn faster if they watch another dog perform the task first, which supports the hypothesis that the observer dogs will learn faster than the model dogs. This information could help the animal training world train their animals more quickly through the use of vicarious learning.

Summary Statement
The goal of this project is to decide whether dogs could learn vicariously, that is, if dogs could learn to perform a task correctly faster if they watch another dog perform the task first.

Help Received
Grandfather helped with idea for project; Father helped find research; Mother helped with board; Teacher (Mrs. Hunker) helped organize project.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Nicole A. Poletto

Project Number
J0331

Project Title
Second Language Learning: Is There an Ideal Age?

Abstract

Objectives/Goals
The problem the experimenter would like to solve is whether children or adults learn a second language faster in controlled conditions. It was always thought that children are better suited to learning a second language. Recent research has shown that it is not necessarily true. Scientists also found that the brain continually changes and develops throughout your life and does not lose its plasticity as once thought. It would be interesting to find out whether or not children learn faster because much of the research has been contradictory.

Methods/Materials
Experimental Procedure
1.Create consent forms for subjects.
2.Develop 20 vocabulary words for the made up language consisting of 10 animals and 10 colors.
3.Design a multiple-choice test.
4.Write a script to teach the new language to children and adults.
5.Teach language in classrooms of children following the script exactly for each class visited.
6.Administer the test to children.
7.Teach the language to the adults using the same script used to teach the language to children.
8.Administer the test to adults.
9.Grade tests from all participants.
Materials
1.Script to teach the language classes
2.Language Test
3.Consent Forms
4.Grading Scale
5.Teaching Boards
6.Pencils and Candy to give to the subjects

Results
There were a total of 120 subjects tested, 41 adults and 79 children. The data seemed to be clear-cut as to who learned a second language faster. The adults scored the highest overall and the children's scores ranged from 0 all the way to 14.

Conclusions/Discussion
The adults clearly scored better on the test.

Summary Statement
The problem the experimenter would like to solve is whether children or adults learn a second language faster in controlled conditions.

Help Received
My mother helped me by taking me to all my testing dates and helping me while I taught the kids. My whole family contributed to the development of the new language vocabulary and was very supportive and encouraging.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Taylor S. Pulbrook

Project Number
J0332

Project Title
Red Light, Green Light: Does the Color of Light Impact Reaction Times?

Abstract

Objectives/Goals
I have noticed that red lights are used as signals to stop immediately. You see red lights on fire engines, police cars and other emergency vehicles as they signal people of their approach. The brake lights on cars light up red in color when vehicles are coming to a stop. My goal was to determine if the color of a light impacts a persons reaction time. If so which color provides the quickest time.

Methods/Materials
I developed a light box with 4 colored lights (red, green, blue and yellow)which was setup 2 meters in front of the subject. Recruited 30 people between the ages of 11-13 as subjects. The tester would randomly select a colored light and press a button which would illuminate the light and start a stopwatch. The test subject would react as fast as possible to push a stop button located 9 centimeters from their hand. When the button was pushed the stopwatch would show reaction time and the tester recorded the time on a log. Each subject was randomly tested to get 5 data points for each of the 4 colors.

Results
Green light yielded the best reaction times with an average time of .419 seconds, followed by yellow at .421 seconds, then red at .441 seconds and finally blue with the worst average reaction time of .447 seconds.

Conclusions/Discussion
Does light color effect reaction times? Yes.

I did this experiment to determine which color would be the best to use when trying to signal for an immediate stop. The faster the reaction time to a color (such as tail lights on cars or emergency lights on equipment) the more lives that could be saved or accidents avoided. I had to reject my hypothesis that red would have the fastest reaction time. I based this on the idea that people are accustomed to seeing red lights for emergencies. Upon further analyses and research green overall did the best in terms of time. The best average reaction stop times were in this order (measured down to thousandths of a second): green - 0.419, yellow - 0.421, red - 0.441, and blue - 0.447.

Summary Statement
I wanted to find out the impact of light color as it pertains to a persons reaction time.

Help Received
Mr. Fonseca for building my light box. Mr. Post (my teacher) for letting me use his room. Dr. Martinez for her time and information on the eye. I appreciate the 30 people that volunteered to be test subjects. And lastly my Mom and Dad for helping me to clarify my project.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Bradley M. Rogers

Project Number
J0333

Project Title
Free Choice vs. Random Numbers

Abstract

Objectives/Goals
The reason I chose this project was to see if there were any similarities between random number generation and free choice. My experiment is related to mathematics and human behavior. I also chose it because I was interested in learning how a random number generator works and how they are used.

Methods/Materials
1. A random number generator. 2. Piece of paper with the number One through Four clearly written on it. 3. Note book to record results of tests. I made a sheet that had four colors; blue, orange, yellow, and green. Then I had to make a column to write which number the subject chose and color that was chosen out of the random number generator. Then I tested one hundred people.

Results
The outcome of my experiment is that there really is not a similarity between random generation and free choice. You can see in my graphs that people favor the number three and dislike the number one.

Conclusions/Discussion
The only major conclusion in my experiments that one out of a sample of one hundred people, there favorite number is three and really no one chose the number one. For further study if I were to do this again I would use more test Subjects. If I used one thousand subjects it would be perfect since my random number generator did not come out perfect.

Summary Statement
Free choice and random numbers.

Help Received
my mother for helping me with typing my report . and my father for helping me build the number generator.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Lee C. Rubinoff

Project Number
J0334

Project Title
The Magic Eye

Abstract

Objectives/Goals
The objective is to determine if nearsighted and farsighted people perceive hidden 3-D images differently.

Methods/Materials
Informed consent was obtained from 78 people. The subjects were asked as to which "vision category" they belonged, i.e., nearsighted, farsighted, or "20/20" vision. Colorblind subjects were ruled out by using standard dotting tests. Subjects were shown a simple hidden 3-D image from the "Magic Eye" image book. If able to see the hidden image, they were asked if they perceived the image as being concave or convex. Three additional images of increasing difficulty were presented to the subjects. Subjects being able to perceive 50 percent or more of the images were scored as being able to "view" the hidden 3-D images. Those subjects perceiving less than 50 percent of the 3-D images were scored as not being able to "view" the hidden 3-D images. Each vision category was analyzed as to the number and percentage of subjects viewing the 3-D images as being concave, convex or not perceived.

Results
A total of 78 people were tested. Of these, 31 subjects were nearsighted, 19 were farsighted, and 26 had "20/20" vision. Two subjects were colorblind and excluded from this study.
Of the 31 nearsighted subjects, 25 subjects (80.65 percent) viewed the image as being convex; and six (19.35 percent) did not see the image.
Of the 19 farsighted subjects, 15 subjects (78.95 percent) viewed the image as being concave; one (5.26 percent) saw the image as convex; and three (15.79 percent) did not see the image.
Of the 26 "20/20" subjects, 24 subjects (92.31 percent) viewed the image as being convex; and two (7.69 percent) did not see the image.

Conclusions/Discussion
From this study with a limited number of subjects, it appears that nearsighted people and those with "20/20" tend to view 3-D images as being convex. Farsighted people tend to view the images concave.

Summary Statement
This project is to find out if farsighted people and nearsighted people view 3-D images differently.

Help Received
Optometrist gave me information on eye anatomy, Father helped edit report, Science teacher provided guidelines, Mother proof read report.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Kaitlyn M. Shedd

Project Number
J0335

Project Title
Does Sentence Structure Affect the Ability to Decipher Words?

Abstract

Objectives/Goals
The researcher#s project entitled #Does Sentence Structure Affect the Ability to Decipher Words?# was done to learn and understand more about reading and the way the mind works with deciphering words. When the researcher read the Cambridge's study, she was was amazed how one is able to interpret correct words even though they are misspelled. She also wondered if sentence format gave an advantage to the subjects versus when the words were randomly placed. She chose this science fair project not only because reading experiments fascinate her, but she also wanted to further the knowledge of linguistics knowing how important reading is to mankind.

Methods/Materials
1.Test subjects(22 females & 22 males)that are advanced experience readers
2.Take each subject and ask these questions:
-First name?
-Age?
-Gender?
-What grade did you start reading?
-Any speed reading classes?
3.Have the subjects read both tests.
Test 1: Cambridge's study; words randomly placed
Test 2: Cambridge's orginal study
4.Time how long it takes each subject to read the sentences and mark mistakes.
5.Analyze results and evaluate data.

Results
After looking at the data the researcher discovered that her hypothesis was correct and that the Cambridge study was incorrect by not stating that sentence structure has an effect on reading. With sentence structure both men and women were able to read faster and with fewer mistakes.

Conclusions/Discussion
The researcher's hypothesis was correct because the Cambridge study was incorrect in ignoring sentence structure being extremely important for reading. The subjects were able to read at an average of 59.5% faster and make fewer mistakes (six less) with the test in a proper sentence structure.

Summary Statement
The study of deciphering misspelled words when in proper sentence structure versus when they are not.

Help Received
This year I got so much support and help from so many people, and I just want to say #thanks#. But, there were some people that helped so much and I can#t even describe it. But I want to especially wanted to thank my mom and dad, Debbie and Bob Shedd, my teacher Mr. Tortora, brothers and my friends and to

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Krystal L. Tran

Project Number
J0336

Project Title
Does Bigger Mean Better When You Read?

Abstract

Objectives/Goals
Reading and writing is an important part of daily life, especially for a student. It is unclear whether difference in font size affects readability and comprehension. This experiment examined the effect, if any, that a certain size font would have in improving the comprehension of text. Three groups of size texts were tested under the exact same conditions.

Methods/Materials
The materials used in this project included 109 random middle level grade participants, 545 sheets of 8 1/2 x 11 white copy paper, 1 middle level skimming and scanning testing booklet: Middle Level Skimming and Scanning by Dr. Edward B. Fry, and 1 Stopwatch.
The procedures used in this experiment included: 1) administering 3 reading comprehension tests with different font sizes to 100 randomly selected middle level grade students. The Middle Level Skimming and Scanning booklet by Dr. Edward B. Fry was used with the publishers permission. 2) The testing hours were from 9:00 AM to 10:30 AM, when students are most alert during the day. 3) The limit for each test was 7 minutes.

Results
The results showed that the most readable and comprehensible font was size 10. The subjects# average score on this test was 88.2%. The second most comprehensible font was size 12 with an average score of 87.6%. Size 14 was difficult for most of the participants to comprehend because the average score was 75.5%. Further research changed the order the tests were given: firstly font 14, then font 12, and lastly font 10. The results showed that the most readable and comprehensible font was point 12 with 79.9%. The second most comprehensible font was size 10, having 74.1%. Point size 14 appeared to be difficult for most of the participants to comprehend because the average score for this group was 61.4%.

Conclusions/Discussion
The outcome of Experiment 1 indicated that participants performed better on both the smaller font and the medium size font. Although there was a slightly higher score when the smaller size font was used, the difference in scores was not significant. Experiment 2, which tested if the order mattered, proved that students performed better on font 12. In both experiments, the scores for fonts 10 and 12 were very similar. The experimentation supports the idea that the larger size font 14 was least comprehended. Therefore, Bigger size font is not better when you read.

Summary Statement
This experiment examined the relationship, if any, between font size and reading comprehension.

Help Received
Glencoe/McGraw-Hill Publishing Company permitted the use of 3 passages from Middle Level Skimming and Scanning by Dr. Edward B. Fry; Teachers allowed the participation of students from class; Teacher aided in use of Microsoft Excel.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Catherine M. Troja

Project Number
J0337

Project Title
No Shortcut to Success: Studying Material Retention

Abstract

Objectives/Goals
My objective was to discover whether or not retention of information is affected by the period of time between the study of material and sleep.

Methods/Materials
Fifty-five eighth grade students between the ages of 12 and 14 participated in this study. They were supplied with one page of information concerning the history of Hasbro Inc. and a designated study time, either up to 2 hours before sleep or right before sleep. All participants were directed to study for 15 minutes at their designated time in an upright position at a desk/table. The next morning, all students participating in the study were given the same 8-question multiple-choice test. This procedure was then repeated with a different set of material and another 8-question multiple-choice test on that material.

Results
I was presented with mixed results once the testing was complete. Twenty-nine participants did better when they studied 2 hours before sleep, while 17 did better when they studied right before sleep, and 9 participants got the same score on both tests. Test One's average test score for the participants who studied up to 2 hours before sleep was 74%, while the average test score for the participants who studied right before sleep was 73%, a difference of only 1%. For Test 2, the average test score for the participants who studied up to two hours before sleep was 56%, while the average test score for the participants who studied right before sleep was 69%, a difference of 13%.

Conclusions/Discussion
The number of people who did better studying 2 hours before sleep is significantly higher than that of those who did better studying right before sleep. The difference between the average test scores for Test 2 are just as different from one and other, and these averages prove the opposite: that students who study right before sleep will remember the material better the next morning than if they were to study earlier in the evening.

Because of this contradiction, no solid conclusion can be drawn from this data. I found that the time of day at which material is studied is fairly irrelevant, and that the important thing when dealing with material retention is that the material is studied at all. The time of day at which each student is prepared to learn is the key factor in material retention, and this is different for each individual.

Summary Statement
The problem investigated in this experiment is the effect sleep has on the retention of information.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
James G. Turner

Project Number
J0338

Project Title
Where to Look: Can You Predict Where People Will Look when Presented with a Visual Image?

Abstract

Objectives/Goals
The experiment was meant to show if you can be predicted where most people would look, or where the eye goes first. Because we read left to right, top to bottom, I predict the upper left area of a visual image is where most people will look first.

Methods/Materials
About two hundred students in seven intermediate-grade classrooms were tested four times, using transparencies and an overhead projector. Each transparency had four large block letters. The tests were kept from view until shown, one at a time, on the overhead projector for about two seconds each. The survey forms were passed out before the testing began, and asked for age, boy or girl, and if left or right handed, but no name. The tests were conducted at various times during the school day. After the four tests, the surveys were collected and the results tabulated.

Results
In all of the categories, there were more responses marked for the image in the upper left corner than any other. The upper right had the second most responses, and the lower left and right hand corner#s responses were very low.

Conclusions/Discussion
With intermediate school students, you can predict that the upper left area will be chosen most often. If the experiment were done on younger children, or a group whose language reads differently, then the results might be different.

Summary Statement
My project was to show if you can predict the way the human eye reacts to images.

Help Received
My Dad helped with charts and Excel, my Mom helped with layout and Steve Eso of Bakersfield College helped with statictics.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Brianna R. Weiss

Project Number
J0339

Project Title
The Effect of Gender on Short Term Memory Retention

Abstract

Objectives/Goals
I was trying to show that because males are right brain dominant and females are left brain dominant, gender will effect how people remember.

Methods/Materials
1. picked 15 words and pictures; 2. select volunteers; 3. Test one person at a time; 4. Give them study sheet; 5. Let them study for 2 min; 6. take away sheet and give them writing sheet; 7. Let them write down what they remember; 8. Repeat steps 3-7.

My materials are: 1. stop watch; 2. volunteers; 3. study sheet; 4. writing sheet.

Results
total males and females:
pictures- males 87.5%, females 82%
words- males 10%, females5%
Equal words and pictures- males 2.5%, females 3%

Adults:
Pictures- males 90%, females 89%
Words- males 10%, females 11%
No equal

Children:
Pictures- males 82%, females 54%
words- males 9%, females 31%
equal- males 9%, females 15%

Conclusions/Discussion
I found out that my hypothesis was partly correct. It also shows gender goes effect how you remember. The males did remember more pictures than the females, but the females remembered more pictures then words ,but not as many as the males did.

Summary Statement
I tryed to see if your gender effects how you remember.

Help Received
Mom, Dad, Parents friend to me to their offices to test people, Dad and mom helped me make graphs, mom helped me look for articles on the internet.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Lindsey M. Wrape

Project Number
J0340

Project Title
Reaction Time and How Much It Is Affected by Age

Abstract

Objectives/Goals
For my project I wanted to see how much age affects one's reaction time, and to see if there was a certain point in one's life at which reaction time starts to dramatically increase.

Methods/Materials
I created a computer program that would be used to conduct my experiments by measuring each person's reaction time. I tested people between the ages of 6-85 and divided them into 8 age groups. Each subject was tested 5 times. I tested a total of 120 people on my laptop computer.

Results
The slowest group of people I tested were ages 76-85 & older, with an average of 0.75 seconds. There were two fast groups, both with averages of 0.45 seconds. The first group was ages 26-35, the second group was ages 56-65.

Conclusions/Discussion
I hypothesized that between the ages of 65-85 & older there would be at least a 10% increase in reaction time over the quickest reaction time measured. The second to last oldest age group had an average reaction time of 0.66 seconds. The oldest group had an average reaction time of 0.75 seconds. The quickest time measured was 0.34 seconds. There is more than a 10% increase between these times, therefore validating my hypothesis. I have concluded that reaction time does slow with age, although as one gets older it doesn't just start increasing. It goes in a up-down pattern and once one reaches their mid 60's it steadily increases from there.

Summary Statement
How much age affects human reaction time.

Help Received
Dad: Creating computer program, Dad/Mom: Driving me to get test subjects.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Daisy Zhou

Project Number
J0341

Project Title
Subjective Contours

Abstract

Objectives/Goals
Subjective contours are nonexistent lines that can be perceived. My problem was to find the maximum percentage of homogeneous white area over the total area of one side of an equilateral figure that still sustains a subjective contour. I hypothesized that contours can be perceived when the percentage of homogeneous area is less than or equal to 75%, since many of the designs I have seen had inhomogeneous areas of at least ¼ the total area.

Methods/Materials
My experiment consisted of two designs formed by subjective contours, a triangle and a square, both found in the book The Perceptual World. On the computer, I created 10 cases of different percentages in homogeneous areas for the triangle design and 8 cases for the square. I used the cases to test 25 people and recorded which case they began to perceive the subjective contours (cases go from most homogeneous area to least).

Results
The results for each of the 10 triangle cases were 0, 1, 2, 5, 4, 11, 0, 2, 0, and 0 people at 98%, 94%, 90%, 78%, 65%, 56%, 54%, 46%, 36%, and 23%, respectively. The most number of people (11) began to perceive the lines at 56% in homogeneous area. For the square design, which had 8 cases, the results were 1, 4, 2, 4, 3, 7, 4, and 0 people at 97%, 95%, 94%, 91%, 87%, 75%, 60%, and 33%, respectively. The most number of people occurred at 75%, with 7 people.

Conclusions/Discussion
Using the results stated above, I conclude that there is a threshold, or a maximum percentage of homogeneous area, for perceiving subjective contours. However, that threshold varies according to the shape of the figure formed by the subjective contours. The thresholds for the triangle and square are 56% and 75%, respectively. The findings can be applied to many computer vision based problems, such as detection of lanes on highways and recognition of partially obscured objects.

Summary Statement
Finding the maximum percentage of homogeneous white area over the total area of one side of an equilateral figure that still sustains a subjective contour.

Help Received
Teacher reviewed report and display board; Schoolmates participated in experiment tests.

CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Christopher F. Weyant

Project Number
J0399

Project Title
Visual Perception: Do Children and Adults See Visual Images Differently?

Abstract

Objectives/Goals
My objective was to learn if children and adults see visual images differently.

Methods/Materials
At first, I showed a variety of images to 21 subjects of different ages. I found that children may be more likely to see in two dimensions and adults more likely to see in three dimensions. I found that children may perceive upside down images differently than adults. I conducted a second phase of research focusing on two dimensional, three dimensional, and upside down images. All surveys were conducted in a consistent manner.

Results
I found that children are more likely to see in two dimensions while adults are more likely to see in three dimensions. Based on the survey results, this conclusion is statistically significant at high confidence levels for several visual images. For example, for 3D Image #1, 8 of 25 children saw the 3D image, while 17 of 25 adults (68%) saw it. This difference in sample proportions is statistically significant at the 95% confidence level but not at the 99% confidence level. Another example is the Cubes and Arrows Image where the cubes are shown in 3D and the arrows in 2D. 50% of the children and only 29% of the adults see the arrows which is a statistically significant difference in sample proportions at the 95% confidence level but not at the 99% confidence level. Young people are more likely to see in two dimensions while adults are more likely to see in three dimensions.

I found that young people see upside down images differently than adults. For example, for the Upside Down Pie Image, 15 of 20 children (75%) see the whole pie with one slice missing. Only 5 of 20 adults see this image, with the other 75% of adults seeing the one slice of pie. This difference in sample proportions is statistically significant at the 99% confidence level.

I am currently conducting more interviews with additional images.

Conclusions/Discussion
Children are more likely to see an image in a two-dimensional way, and adults are more likely to see an image in a three-dimensional way. Children see upside down images differently than adults. These findings are statistically significant and are not documented in the literature. When adults prepare images for children to view, they should take into account these differences in visual perception. These results may be meaningful to testing performed to diagnose neurological disorders.

Summary Statement
Children and adults perceive visual images differently.

Help Received
My father taught me how to do statistical analysis of sample proportions.