CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Sarah A. Abelson

Project Number
J0301

Project Title
Memory

Abstract

Objectives/Goals

The reason that I wanted to do this project is that I always wondered if memory depended on your age. I thought it would be fun to do a science project on something I'm interested in. By doing this project I hoped I would figure out if memory gets worse when you get older like people say it does.

Methods/Materials

The materials I used were a timer, lots of paper, a computer, a pen, pencil, a little box, a big box, a ring, a stuffed animal cat, a stuffed animal rabbit, a baby rattle, a tissue, a cd, a book, potato chips, a flashlight, scissors, a hammer, a walkie talkie, a diaper, an ornament, tape, and a ruler.

Results

Objects are harder to remember than names. Looking at an object had the highest average. It is not possible to "look" at a name. People remember objects best by looking at the objects. People remember objects better by looking at a list of objects than listening to objects being read.

Adults have better memory than kids. Younger adults(20-29) have better memory and a higher average than older adults and kids. Older kids remembered better than younger kids.

I also found that people remember names better if they listen to them being read than by being shown the name on a piece of paper. Altogether I found out that people don't remember names or objects very well. The overall average was 13.38 out of 20.

I had some unexpected results also. I did not realize gender made a difference until later. The females remembered better on all the tests than the males. The reason I only examined gender for adults is because there were not enough boys to determine if boys or girls under twenty did better.

Capitalized names were remembered better than uncapitalized names. These results were unexpected. I capialized some of the names and forgot to capitalize thirteen. I noticed it at the end.

Conclusions/Discussion

Adults have better memory than kids. For the two tests(looking at a list and listening to lists) people remembered names better than objects. The thing that interested me though was that people don't remember objects or names very well.

I found that age is not the only thing that affects memory. Capitalization of names and whether or not the person is a female or male affects their memory. There may be other things as well.

Summary Statement

My project is about the effect of different variables such as age, gender, and capitalization on different types of memory.

Help Received

My mother helped check spelling and grammar error. My math teacher, made comments about my project. Subjects donated time (an hour a piece) by taking test. My science teacher, advised me. My sister's boyfriend taught me how to use Excel and do graphs on the computer.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Matthew W. Alexander

Project Number
J0302

Project Title
I Think I Can, I Think I Can't

Abstract

Objectives/Goals
The object of this study is to determine the effect of positive self-talk versus negative self-talk on the percentage of free throws made by subjects.

The hypothesis is that positive self-talk and negative self-talk used prior to shooting free throws will result in a greater number of free throws made when positive self-talk is used.

Methods/Materials
Methods: 77 male and female subjects, ages 9 to adult were studied. Subjects were students from Saint Martin of Tours School, players from park league basketball teams at Barrington Recreation Center, and random basketball players found at pick-up games at Barrington Park, University High School, and Westwood Park. Each subject was informed that the object of the experiment was to make as many free throws as possible. Each subject was asked to shoot a free throw after repeating one of eight negative or positive statements as instructed. 616 free throws were observed and recorded.

Materials: Clipboard, Tally chart, Pen, Basketball, Basketball court, Cooler with Gatorade, water, and candy bars.

Results
Results showed that free throw percentage was higher following negative self-talk statements (41%), as compared to positive self-talk statements (37%).

Conclusions/Discussion
This experiment did not support the hypothesis.

The prediction that there would be a greater number of free throws made when subjects used positive self-talk statements as compared to when they used negative self-talk statements did not prove to be true.

The hypothesis may not have been supported due to a flaw in the experiment. The instructions given to the subjects at the beginning of testing to "make as many free throws as possible" may have influenced the performance of subjects.

Summary Statement
The effect of positive and negative self-talk on free throw performance

Help Received
no

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)

Martin Anguiano; Cassidy Hollinger; Yovani Jimenez; Willy Schmitt

Project Number

J0303

Project Title

Memory Lane

Abstract

Objectives/Goals

To discover which type of short-term memory was the strongest.

Methods/Materials

Six students, three boys and three girls between the ages of 11 and 13, were randomly selected, and gave us informed permission to participate in our short-term memory experiment. We created four sets of items to test each of the following short-term memories: visual, olfactory, auditory, and reading.

Results

We tested three sixth grade girls and three sixth grade boys. The average number of smells that the subjects correctly identified was 7 out 10. The average number of words that they read, and remembered correctly out of ten was eight. When they studied a composition of 10 pictures for thirty seconds, the average number of pictures they remembered correctly was 9. Then, when we tested their auditory memory, the average number of words they remembered correctly was 9.

Conclusions/Discussion

Our hypothesis was correct. Visual memory was found to be strongest in our tests. Surprisingly, we also discovered that auditory memory was just as strong as visual memory. In each of the four categories tested, we averaged the scores of all six subjects to arrive at a composite score for each category. After doing this, we found that visual and auditory memory both averaged a score of nine out of ten. We think our hypothesis was proven correct because the subjects were able to retain more factual details by picturing the visual images in their minds. The reason we think that auditory memory also came in equally strong as visual is because once you hear something you can usually see it in your mind as well. We will show you what we mean: hot fudge sundae! See!

Summary Statement

We investigated different types of short-term memory, and found that visual and auditory short-term memory were the strongest through our tests.

Help Received

Teacher instructed us on the use of Microsoft Excell to make our graph.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Daniel Bibl; Andy Lai

Project Number
J0304

Project Title
Spatial Ability vs. Sense of Direction

Abstract

Objectives/Goals
The objective is to determine if a person's spatial ability is related to his/her sense of direction.

Methods/Materials
Each subject was given a 3-part spatial test and a 2-part sense of direction test.
Spatial test A: 2D to 3D mapping test
Spatial test B: 3D rotation test
Spatial test C: 2D memorization test
Direction test A: A test where the subject is given a map with starting and ending points to study for up to 10 minutes. Then, they have to take us to the given destination without the map.
Direction test B: A test where the subject has to retrace a route on Stanford campus. They had been taken through this route about 1½ hours before, but were unaware that this was part of the test.
We also created a scoring rubric that was used with the sense of direction tests.

Results
Subjects with good spatial test A scores did well on the direction tests.
Poor spatial test A subjects' sense of direction score varies from high to low.
There was no subject with a high spatial score but low sense of direction score.
Spatial test B is too short.
Spatial test C is too easy.

Conclusions/Discussion
A person with a good spatial ability always has a good sense of direction. However, a person with a good sense of direction may not have a good spatial ability. From this project, we learned that one section of our spatial test practically controlled the score of the test. The other parts of the spatial test had too few problems or were too easy and didn't have significant contributions to the overall spatial ability score. We realize that one skill, the ability to transform 2D objects into 3D objects in your mind, determined most of the spatial test score.

Summary Statement
This project finds out if spatial ability and sense of direction are related.

Help Received
We received help from our parents who drove the subjects between their homes and the test site on Stanford University Campus. Another major contribution was, of course, the subjects who voluntarily gave up time to take our tests.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Emily S. Blythe; Katherine L. Ward

Project Number
J0305

Project Title
Sensational Scents

Abstract

Objectives/Goals
Question: Can we trick our brain by adding colors to fragrances?
Hypothesis: If we add different shades of green to six varied concentrations of a mint fragrance, then it will be harder for the subjects to put them in order based on concentration.

Methods/Materials
Procedure: 1. Mix six solutions of mint from weak to strong, and six shades of green, dark to light. 2. Have subjects smell each test tube and put in order according to scent. We have the darkest color with the weakest scent and the lightest color with the strongest scent (experimental group used colored solutions, and control used clear solutions). Materials: green food coloring; 2 test tube holders; mint extract; 12 test tubes; stopwatch; dropper; 100 subjects: 50 control, 50 experimental (5 male and 5 female per age group).

Results
We found that the number of correct placements according to scent for the control group was 89 and for the experimental group was 55 (out of 300 possible correct).

Conclusions/Discussion
Our results support our hypothesis. The control group averaged 1.78 correct placements per person and the experimental group's average was 1.10. We think that people use their eyesight to help them make sense of smell.

Summary Statement
We tested 100 subjects to find out if our vision affects our ability to recognize strengths of scents.

Help Received
Mothers helped with transportation and getting supplies. Subjects were from UCSC, Dominican Hospital, and Bonny Doon School and community.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Katharine M. Bukaty

Project Number
J0306

Project Title
How Fast Can You React?

Abstract

Objectives/Goals
My experiment was chosen to find out if people react to sound faster with a blindfold or without a blindfold.

Methods/Materials
On the computer I tested people's reaction times. They were asked to react as fast as they could to a beep on the computer. I tested 22 convenient people between age 9 and 45 and discarded 1 person's results. I tested each of my subjects 22 times with the blindfold and 22 times without the blindfold, and then I recorded how fast they reacted. The computer measured how fast it took them to react in milliseconds. I averaged all results and threw out the high and low times.

Results
The average reaction time with the blindfold on was .328 seconds and without the blindfold it was .308 seconds. Therefore, my subjects reacted faster without the blindfold on. Also I noticed that overall, adults did better than kids.

Conclusions/Discussion
I concluded that my hypothesis (people can react faster with the blindfold) was incorrect, and my subjects reacted faster without the blindfold on. I think that happened because with the blindfold on, they might have forgotten what they were doing and got distracted, achieving a slower reaction time. Now I realize that having a blindfold on or off affects your reaction time to sound. In the real world people could use this information while swimming competitively to know whether or not they should start with their eyes open or closed to get a better start after they hear the starting horn. If they open their eyes, they will get a faster start.

Summary Statement
My project is about testing people's reaction time to sound to see if they react faster with or without a blindfold.

Help Received
My dad helped me type my report. My dad's friend developed the computer program to measure reaction times. My mom helped me glue things on my backboard.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)

Tierney R. Burke

Project Number

J0307

Project Title

An Early Screen for Autism: Detection by Measurement of Differences in Visual-Spatial Orienting

Abstract

Objectives/Goals

Autism is a complex neurological disorder that has increased dramatically in incidence over the past 30 years. Genetics and environmental factors play a role in causing the condition. This project was designed to evaluate a "general screen" that would focus on detecting early indicators of autism related to vision dysfunction. These characteristics include abnormal eye contact, unusual visual interests, empty gaze, and abnormalities in orientation to visual stimuli.

Methods/Materials

The study uses a 3-light display (a central green light, and two lateral red lights) which activate with switches. Participants (ranging in age from two to eleven) were monitored for their visual reactions to the flashing lights. The "first part" of the test looked at the eye focus when a central, green light is turned on to prompt their attention, followed by the activation of a lateral red light while the green light turns off. The "second part" of the test looked at the eye focus when a central, green light is turned on, and stays on, when the lateral red light turns on.

Results

Both "typical" children and autistic children were able to change their gaze in the "first part" of the test when the first, central light is turned off as the second red light stimulus is turned on. The "second part" of the test found children with autism had difficulty disengaging from the first light and shifting to the second light when the first light stayed on.

Conclusions/Discussion

Abnormalities in visual-spatial orienting were detected in autistic children with the simple, visual screen. The hypothesis was supported in the population tested. Children with autism showed evidence of selectively responding to only a small part of the stimulus array presented. Since this screen does not require language, it could potentially be applied to infants. The next step to investigate would be to test children in the age range from 6 months to 24 months. If the screen could be applied to this age group, earlier detection and intervention could be initiated to improve outcome for autistic patients. For further analysis, evaluation against IQ scores, and other neurological disorders would be needed to determine the sensitivity and specificity of the screen.

Summary Statement

A "general" population screen studying visual response to light stimuli can be used to detect dysfunction of eye movement in young, autistic children.

Help Received

My uncles, Robert Blake and Richard Blake assisted in the construction and wiring of the light display test assembly used in testing. My uncle, Thomas Blake instructed me on the use of the graphing program, Statistica, to create the 3-D graphs.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Reid N. Clow

Project Number
J0308

Project Title
Driven to Distraction

Abstract

Objectives/Goals
I wanted to see whether talking on a cell phone impairs driving ability, which has not been studied very much. So I created an experiment using a video game that simulates driving, and found 30 subjects of all ages to participate in the test. Going in, I hypothesized that cell-phone conversation would impair driving.

Methods/Materials
First, subjects "drove" the videogame course without talking on the phone, and their time was recorded. Then, they repeated the game, but had to answer a series of 25 unrelated questions during a cell-phone conversation. Once again, their times were recorded. I compiled the results, and broke them down into several subcategories such as "high videogame comfort level" or "medium to high cell-phone use while driving."

Results
The video game test of driving skills overwhelmingly showed that my hypothesis was correct: Cell-phone conversation impairs driving. A total of 21 of 30 people tested scored worse when talking on the phone. Every way I broke down the data, I came up with the same result: Cell-phone use made the "drivers" slower, or less effective, on the course.

Conclusions/Discussion
My overall results showed the average driving time increased by 4.3% but the ranges in subgroups varied more. The average driving time for females, for instance, varied by 14.4%, a much higher statistic while people who had a high comfort level with video games had a blip of an increase, only 0.5%.

If I were to do this project again, I would try to take the learning curve into account, which I believe would make my findings even stronger. I also would try to account for why females faired the worst while using a cell phone and driving.

Summary Statement
Does talking on a cell phone while driving impair a person's ability to drive?

Help Received
Sister and mother helped ask cell-phone questions; father helped analyze data; mother proofed graphs and report; neighbors and friends were test subjects.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Carissa B. Cummings

Project Number
J0309

Project Title
Color Fast or Color Slow: Which Color Is Best in Show?

Abstract

Objectives/Goals
My problem statement was: Does reaction time to a light stimulus depend on the color of the light? I tested to see if one specific color had a faster reaction time than another. I hypothesized that the reaction time will not be the same for all tested colors.

Methods/Materials
1 Photographic Color Enlarger, 1 Oscilloscope, 1 On Switch, 1 Off Switch, 1 White Box, 10 Data Sheets, Low Voltage Wire, 1 9V Battery, 1 9V Battery Connector, 9 Colors of Light, 10 Test Subjects, Sorce of AC Power, 2 Small Aluminium Boxes, 1 BNC Connector Wire, Chassis Punch, 1 CD Player, 1 Drill Press with drill bits, 1 T-Bevel, 1 Table Saw

Results
The color blue had the slowest reaction time. The color white had teh fastest reaction time, but magenta had the second fastest reaction time.

Conclusions/Discussion
From this experiment, I conclude that the subtractive colors of yellow, magenta, cyan and white have the fastest average reaction times.

Summary Statement
I tested the reaction time of people to ten different colors of light.

Help Received
My father helped me use the table saw, the drill press and the other tools. He helped me acuqire the oscilloscope and the color head.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Trang T.D. Dinh

Project Number
J0310

Project Title
Semantic Encoding vs. Acoustic Encoding

Abstract

Objectives/Goals
The objective of the experiment was to see whether the usage of acoustic or semantic encoding would be best in memorizing a number of unrelated items in a short amount of time.

Methods/Materials
I had 110 students, ranging from 7th-8th grade, and randomly splitted them into two groups, Group A and Group B. I tested Group A using acoustic encoding. First, I gave Group A the 1st board with 20 unrelated items and asked them to remeber as many items as possible in a time intervel of 20 seconds. That was the pretest. Then I gave them a tape recorder with numerous random items repeated out-loud over and over. The point of this was to prime up Group A to use this acoustic encoding method in their second board. Then the 2nd board was brought out and Group A was asked to do the same thing in 20 seconds, except this time Group A was remembering the items by saying them out-loud. That was the posttest. For Group B, the group using semantic encoding, I gave them the same tests. The only thing was that between the pretest and the posttest I taught Group B a memory technique using semantic encoding. The memory technique envolved linking all the different items into one story. So in their posttest board, Group B subjects were remebering the items by linking the 20 different items into one story.

Results
For Group A, using acoustic encoding, there was really no difference between the numbers of items remembered between the pretest and the posttest, 0.09. However, Group B had an average of 4 items remembered more in the posttest then in the pretest, which is quite significant.

Conclusions/Discussion
My conclusion is that semantic encoding allows one to remember more in a longer amount of time then acoustic encoding does. That's because semantic encoding allows information to slid into the long-term memory from the short-term memory.

Summary Statement
My project is about semantic encoding and acoustic encoding and which one is better at allowing a person to remember more information.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)

Paige Eckhaus; Pailey Salomonson

Project Number

J0311

Project Title

Optical Illusions: Do Gifted Students See Optical Illusions Differently from Average Students?

Abstract

Objectives/Goals

Our objective was to study the difference in the perceptions of gifted students and average students. We compared responses of gifted and average labeled students, based on academic performance and school standards, to pictures of optical illusions to determine of there is a difference in how they perceive these ambiguous pictures.

Methods/Materials

We copied 6 optical illusions in black and white and lamenated them for protection. We questioned 20 gifted students, after receiving parental permission, and 20 average students about what they first see in each of the 6 pictures. Each subject was tested individually and their comments were kept confidential.

Results

We concluded from the experiment that intelligence does not significantly affect how a young subject views an optical illusion. When comparing gifted and average student responses, it was basically 50/50 whether the groups agreed with each other. Rather, we determined life experiences play a much greater role in what an individual sees instead of intelligence.

Conclusions/Discussion

By analyzing our results, we found our hypothesis, that gifted subjects will perceive illusions differently than average subjects, was incorrect. There was no clear difference in responses based on the label of the two groups. Using the research we conducted, we analyzed the data to explain how the brain tries to solve an illusion. The research, and our experiment, both indicate that background experiences work with the eyes to fill in ambiguous pictures so they make sense to the brain. Therefore, life experiences rather than intelligence show a difference in how each individual perceives an illusion.

Summary Statement

We tested gifted and average students to determine how intelligence levels affect perception of optical illusions.

Help Received

Our mothers helped type pieces of the report. Our teacher taught us the scientific process and supervised the testing to maintain anonymity and respect for individuals. She also helped cut the tag board since it is thick and can be dangerous. We discussed how to analyze the data we acquired with our teacher and a

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Alex S. Garrison

Project Number
J0312

Project Title
Brain Freeze: How Do Moderately Cold Temperatures Affect Human Physical and Mental Performance?

Abstract

Objectives/Goals
My project was to determine if twenty minutes of exposure to fifty degree temperatures would effect subject's ability to perform basic mental and physical tests. My hypotheses were: My subjects will perform basic mental and physical tests quicker when warm than after twenty minutes of exposure to fifty degree temperatures and children will show a greater difference in times between cold and warm tests.

Methods/Materials
Informed consent was obtained for eight subjects (3 adults and 5 children). Each subject sat on my patio (in similar clothing) for twenty minutes and then completed five timed tests to measure physical and mental ability. The tests included: adding, measuring, copying a number pattern onto their hands, looking up phone numbers, and screwing nuts and bolts(with a wrench or hands). They did the tests inside (when warm) and outside (when cold). Subjects were warmed using heated blankets and hats and sat by a fire for a minimum of thirty minutes. Each subject's total warm and cold tests times were compared and children's results were compared to adults.

Results
All subjects overall testing times were markedly slower after exposure to cold and children had a greater difference between cold and warm test times than adults.

Conclusions/Discussion
My conclusion is that even short exposure to cold can significantly affect a person's ability to perform both mentally and physically. This finding is important because it demonstrates that hypothermia can impact us as we go about our daily activities. Chilren's ability to perform on graded school work and tests after winter recess breaks is a concern.

Summary Statement
My project examines the effects of mild hypothermia on subject's ability to perform basic mental and physical tests.

Help Received
My mother helped me with my display and typing. My father timed the tests for me. Mr. Michael Marotta , a local physical therapist , acted as my qualified scientist.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Miriam C. Glicksberg

Project Number
J0313

Project Title
Is Relative Pitch Inherited?

Abstract

Objectives/Goals
My objective is to determine if relative pitch, our ability to sing in tune, is an inherited behavior, or if it is due to environmental or random factors.

Methods/Materials
Informed consent was obtained from 41 individuals from 8 families. Each person sang a simple tune three times, holding 10 notes long enough for me to measure the pitch electronically. I converted the notes into number values, and made graphs for each family using the data normalized to the expected notes for good singing. I identified five singing patterns and examined the families for similarities. I also looked at whether good singers had more music lessons than bad singers.

Results
Singing patterns were not random within families. Good and bad singing ability did not correlate with music lessons. Assuming that bad singing is inherited as a single Mendelian trait, I ruled out autosomal dominant, X-linked dominant and X-linked recessive inheritance patterns.

Conclusions/Discussion
The data suggest that the behavior known as relative pitch is likely to be genetic. I tested whether bad singing fits any simple Mendelian inheritance models, and found that it might be inherited as an autosomal recessive trait.

Summary Statement
I discovered that families have specific ways of singing out of tune, and that genetics is more important than environment for this behavior.

Help Received
Mother taught me genetics and computer use; cousin loaned me electronic pitch indicator.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Jonathan S. Goodman

Project Number
J0314

Project Title
One Brain - Two Hemispheres

Abstract

Objectives/Goals
The purpose of this project was to determine which combination of hand usage and visual field coverage would produce the best results in left-handers and right-handers.

Methods/Materials
In order to do this, right and left-handed subjects were given four separate tests to take under different scenarios, which were varied for each subject. Two of the testing scenarios were for the subject to wear RVF glasses (left visual field covered with tape) and mark the answers with his/her right or left hand. The other two scenarios were for the subject to do the same thing while wearing LVF glasses (right visual field covered with tape). The subject received forty-five seconds to complete each test.

Results
Right-handed subjects, wearing RVF (right visual field) glasses, scored an average of 8.33 using their right hand, and 7.39 using their left hand. Right-handed subjects, wearing LVF (left visual field) glasses, scored an average of 7.88 using their right hand and 7.52 using their left hand. Left-handed subjects, wearing RVF glasses, scored an average of 5.67 using their right hand, and 5.89 using their left hand. Left-handed subjects, wearing LVF glasses, scored an average of 5.7 using their right hand, and 6.74 using their left hand.

Conclusions/Discussion
These results showed that the speech and math center of right-handed people is located in their left hemispheres. The margin between the average scores in the subjects is very small, which is mainly because the corpus callosum can pass information extremely fast between the two hemispheres. The contradicting results of left-handed subjects shows that left-handers, as opposed to right-handers, do not have consistent hemispheric asymmetry.

Summary Statement
The purpose of this project was to determine the different functions of the right and left hemispheres of the brain in right and left-handed individuals.

Help Received
My teacher helped edit my report

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Joshua W. Grondalski

Project Number
J0315

Project Title
Rat Craze

Abstract

Objectives/Goals
Does the age of a rat determine how quickly it learns to run through a maze and improve its clocked running time each trial?

Methods/Materials
Three different age groups of rats were used. Two rats from the same litter were used for each age group. The age differences were approximately two to three months between groups. The group names were Adult, Teen and Child. The same maze and five maze designs were used from my 2002 Science Fair project so I could compare results. Each maze design had 20 turns and 10 dead ends. The start and finish for each maze was rotated so they were not located in the same spot for each maze. Special treats were placed at the finish line each trial run. I decided to have each rat have ten trials in each maze over a five day period. Each trial time was recorded in my log book

Results
The Teen group of rats had the fastest average time through the maze over all the others with a time of 40 seconds. The Child group had the second fastest time with 44 seconds. The Adult group had the slowest time with 53 seconds.

Conclusions/Discussion
I wanted to find out whether different aged rat groups ran through a maze at different average times. The Teen group was the fastest of all the rat groups. I thought the Adult group would be the fastest. They ended up the slowest only because they were very hesitant in the first run in the first maze. Once the Adults figured out what to do, they had the best time for mazes three and five and the second best time for maze four. There was only a 13 second difference between the fastest Teens and the slowest Adults. That is not a very large difference considering the difficulty in getting through the maze. Had the Adult group done better in their very first run, there would have been an even smaller difference in the three group's times.

From the results of my project, I feel that there really is not a significant difference in the age of a rat and its ability to learn to run through a maze.

Summary Statement
Does the age of a rat determine how fast it can learn to run through a maze?

Help Received
Grandfather and Father helped create the maze; Mother helped with board and typing of the report

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Yonatan Y. Halevy

Project Number
J0316

Project Title
Stressed Out? Stretch Out!

Abstract

Objectives/Goals
In this project, it was attempted to find out if shoulder shrugs or neck rolls help to reduce stress.

Methods/Materials
To test this, over 100 subjects from the Soille San Diego Hebrew Day School were taken and asked to take an electronic stress test. The stress test consisted of a wire on a piece of wood. Attached to the wire were a ring and a buzzer. The subject must pass the ring along the wire without touching the wire. If the wire is touched, the buzzer will buzz. After they took it, they were then asked to do an exercise based on what group they were in. The three groups were neck rolls, shoulder shrugs, and no exercise. After, they took the stress test again. The results were based on how much change there was between the two scores. If the score increased, it showed that the subject did better and stress was reduced.

Results
The results of this project were as follows. In the shoulder shrugs group, only 14 of the subjects improved, 18 of them did worse, and 10 of them stayed the same. In the neck rolls group, 23 of the subjects improved, 9 of the subjects did worse, and 8 of the subjects stayed the same. In the no exercise group, 11 of the subjects improved, 10 of the subjects did worse, and 11 of the subjects stayed the same.

Conclusions/Discussion
Overall, the shoulder shrugs group's scores decreased, the neck rolls group's scores increased, and the no exercise group's scores varied. Neck rolls were the most effective exercise for stress reduction.

Summary Statement
Do neck rolss or shoulder shrugs help to reduce stress?

Help Received
Adult friend helped design board.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Stephanie M. Hatayama

Project Number
J0317

Project Title
Effects of Age and Sex on the Aggressive Behavior of Chickens

Abstract

Objectives/Goals
The objective is to determine if age and/or sex has an effect on aggressive behavior in chickens when a stress is introduced.

Methods/Materials
Fifty 2-month chicks of unknown sex were placed at one end of a 3'x 9' pen with a container of feed at the opposite end. A strong stream of air was blown across the center of the pen at breast level to provide a physical/psychological stress point for the bird to cross to reach the feed. This procedure was repeated for birds aged 6 and 12 months. These 2 age groups had 25 roosters and 25 hens. All birds were tested and timed twice to determine if and how long it took to cross the barrier to reach food.

Results
Eighty-nine percent of the 2-month females crossed the barrier with an average time of 18 seconds. Only 7 of the 2-month chicks were determined to be male. Seventy-one percent crossed the barrier with an average time of 8 seconds. Eighty-four percent of the 6-month hens crossed the barrier with an average time of 27 seconds. Seventy percent of the 6-month roosters crossed the barrier with an average time of 50 seconds. Ninety-six percent of the 12 month hens crossed with an average time of 22 seconds. Eighty-four percent of the 12-month roosters crossed with an average time of 58 seconds.

Conclusions/Discussion
Hens were least affected by the stress of the air barrier, more aggressive, and had a higher percentage of crossing the barrier to reach food in all 3 age groups. It appears that sex does affect aggression in chickens. The data was inconclusive for age having an effect on aggressive behavior although the 2-month olds were more aggressive in both sexes. Knowing that females are more aggressive than males may be important for breeding purposes. Females are more focused on obtaining food, probably due to being egg layers. This is a desirable trait to continue the breed. The data suggests that six months is a good age to introduce birds to each other in a flock. There may be less problems with pecking order confrontations.

Summary Statement
My project determined whether age and sex had an effect on aggressive behavior in chickens.

Help Received
Mr. Carl Gong helped with data tables and graphs. My parents, brother and sister helped catch chickens and cut out letters for display.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Chisato (Chisa) U. Hughes

Project Number
J0318

Project Title
Perception Deception? Does Low Blood Sugar Affect a Diabetic's Perception of Sweetness?

Abstract

Objectives/Goals
The purpose of my project was to find out if Type I insulin dependent diabetics would perceive sweetness less accurately when they are "low" blood sugar (under 80 mg/dl) than when they are "good" blood sugar (100-150 mg/dl).

Methods/Materials
To test the subject's perception of sweetness, I had the subject rate the amount of sugar in a series of containers from least sweet to sweetest. Their level of accuracy was determined by how many of the six containers the subject had in the correct order. Subjects had a small bite of cracker in between samples to clear their taste buds. Non-diabetics were used as a control group.

Results
By using the three measures of central tendency (mean, median, and mode) to evaluate the diabetics# and non-diabetics# test scores, a verdict could be established. The diabetics# "good" blood sugar scores (an average of 5.125 correctly ordered out of 6) were, on the whole, more accurate in determining sweetness than the diabetics# "low" blood sugar scores (an average of 4.25 correctly ordered out of 6). Mean scores indicated that the diabetic subjects tended to be more accurate in determining sweetness than the non-diabetic subjects (an average of 4.125 correct).

Conclusions/Discussion
The results suggested that when a diabetic is low blood sugar, their perception of sweetness is less accurate. These results tended to support my hypothesis that diabetics with low blood sugar may experience some confusion and blurring of the senses. However, diabetics# average scores, both when they were "low" blood sugar and when they were "good" blood sugar, were more accurate than the non-diabetics#. This leads me to think that since non-diabetics tend to have more sugar in their diet than diabetics, they become desensitized to the sugar.

Summary Statement
My project indicated that diabetics' perceive sweetness less accurately when they are low blood sugar.

Help Received
Dr. Ted Humphry, M.D., helped me find diabetic subjects to test, my mother helped deliver testing kits to diabetic participants, helped me with the graphic design of the title, and also helped me get supplies for my project. My father helped edit my conclusion as well as my results.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Rianna E. Isaak

Project Number
J0319

Project Title
Determining if Age, Gender, and Parkinson's Affect Brain Hemisphere Communication

Abstract

Objectives/Goals
I am trying to find out how the different variables (age, gender, Parkinson's disease) affect brain hemisphere communication (BHC).

Methods/Materials
I made a video of 20 words that appear on the screen one at a time. Each word is printed in a color other than its own name. I tested 2nd, 4th, and 6th grade students, as well as adults with and without Parkinson's disease (87 people in all). In test one, the person was asked to read the words that flashed on the screen. In test two, they were asked to identify the color the word was printed in. The difference between the scores of the two tests indicates how well the two brain hemispheres communicate, the BHC score.

Results
I found that the older a person gets from 2nd grade up to adults age 50, the better their BHC score becomes. Gender, however, does not seem to make a difference in the BHC score. Boys were better in 2nd, girls better in 4th and 6th, and male and female adults had the same BHC score. People with Parkinson's had a poor BHC score, more than two times the 2nd grade score.

Conclusions/Discussion
Age does make a difference in brain hemisphere communication (BHC). The older a person is, at least up to 50 years of age, the better their BHC score. Gender does not make a difference in BHC. Parkinson's disease makes a huge difference in the BHC score. However, there was no correlation between the number of years someone has had Parkinson's and their BHC score.

Summary Statement
My project is about determining how age, gender, and Parkinson's disease affects brain hemisphere communication (BHC).

Help Received
Mr. Russell helped with editing the board documents and with internet research. Mr. Gong helped me make the video. Mom and Dad helped type the report, make the board, and arrange for testing those with Parkinson's and some of the adults.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Willow S. Jacobs

Project Number
J0320

Project Title
I Think, Therefore I React

Abstract

Objectives/Goals
The purpose of my project is to determine whether age or gender affects reaction time greater. I hypothesize that age will affect reaction time greater than gender. My hypothesis is based on research that shows that there are critical changes in the central nervous system with advanced age that would slow reaction time.

Methods/Materials
My project used a ruler, stopwatch, and a reaction time test on the internet to determine reaction times of subjects in five age groups. The same amount of males to females were in each age group. The ruler was dropped through each subjects fingers and the point at which they caught it was recorded. The stopwatch was used to see how quickly each subject could start and stop time. The internet was accessed and each subject took the same reaction time test. Each test was repeated three times for each subject and the results were averaged.

Results
My results showed that the differences between males and females in each test were very small. The age group that consisted of subjects who were twenty to thirty years old, achieved the fastest reaction times. The subjects that were in the oldest age group and the youngest age group had the slowest reaction times. I found that the differences between the fastest and slowest age groups were large compared to the differences between genders.

Conclusions/Discussion
My data supported my hypothesis that age affects reaction time greater than gender. This data may further greater research in the medical and engineering fields to aid ageing populations with reaction time exercises or creating tools to obtain intact central nervous system activity.

Summary Statement
My project used three tests on people of different age groups to determine what affects reaction time greater, age or gender.

Help Received
My teacher Ms. Solaegui was my mentor during this project and helped me with my methodology and proofing papers. My teacher Mr. Snell and my mom also helped to proof read papers and guide me through research.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Elizabeth A. Jones

Project Number
J0321

Project Title
Can People with Autism Integrate Both Sight and Sound at the Same Time?

Abstract

Objectives/Goals
My objective was to determine if people with autism have problems integrating sight and sound at the same time. This could help explain why their world is so overstimulating to them.

Methods/Materials
Eight people with autism and eight people without autism were tested using a powerpoint presentation. The powerpoint presentation flashed twenty simple pictures with a varying number of beeps (1, 2, or 3). Each student told me what they saw and heard after each slide. The first ten slides were with a one second delay. The second ten slides were shown faster using no delay.

Results
For people with autism, 63% saw all the pictures correctly at the slower speed. At the faster speed, 75% saw all the pictures correctly. At the slower speed, 25% heard the correct number of beeps. At the faster speed, 0% heard the correct number of beeps.

For people without autism, 100% saw all the pictures correctly at the slower speed. At the faster speed, 88% saw all the pictures correctly. At the slower speed, 50% heard the correct number of beeps. At the faster speed, 25% heard the correct number of beeps.

Conclusions/Discussion
People with autism had a harder time integrating both sight and sound at the same time. These results could help people with autism and those that interact with them to concentrate on using one sense over the other.

Summary Statement
Project used powerpoint presentation to determine if people with autism can integrate both sight and sound at the same time.

Help Received
Mrs. Wallters, the special education teacher at my school helped me find students with autism for my experiment. My mom helped me import WAV sound files into my powerpoint presentation.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Thomas P. Kovilakath

Project Number
J0322

Project Title
The Key to Relaxation

Abstract

Objectives/Goals
My objective for this project was to determine if listening to no music, music in a G major key or music in a G minor key will cause my subjects' heart rate and/or respiratory rate to decrease quicker after six minutes of exercise. I believe that the minor key will cause people to physiologically relax faster than music in a G major key or no music at all.

Methods/Materials
My project included eight human subjects, all women, ranging in age from 18-53. I put each subject on stationary bike for six minutes. Then I had them sit and relax in a chair while listing to either no music, music in a G major key or music in a G minor key. My subjects were hooked up to an EKG machine and a pulse transducer to record heart rate. At the same time I recorded their respiratory rate using a stethoscope. Every two minutes the data was recorded.

Results
My results showed that there was no case in which the people relaxed at a greater rate with no music. The average heart rate drop for no music was 27.96%, for G major 28.7%, and for G minor 33.40%. Overall G minor decreased the heart rate more over a six-minute period even though 3 out of the 8 subjects heart rate dropped more with G major. The average heart rate drop was over 5% greater for the G minor and less than 1% for G major than with no music. The average respiratory rate drop for no music was 29.93%, for G major 40.63%, and for G minor 41.53%. Overall G minor decreased the respiratory rate more over time even though the same number of subject (4) dropped more with G major. The average respiratory rate drop was over 10% greater for G major & G minor when compared to no music.

Conclusions/Discussion
It turns out my hypothesis was accurate in saying that the minor key (# 3: C.P.E. Bach: Largo in G minor) will cause the subjects to physically relax faster than no music or the major key (#6: J.S. Bach: Minuet in G). What was strongly represented in this study was that music's major and minor key caused my subjects to relax (decrease their heart & respiratory rates) faster over several minutes compared to no music at all. And the G minor key did have the greatest overall relaxing affect.

Summary Statement
I wanted to determine if listening to no music, music in a G major key or music in a G minor key will cause my subjects' heart rate and/or respiratory rate to decrease quicker after six minute exercise

Help Received
Used Lab Equipment at Santa Rosa J.C. where my Mother is a professor

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Lindsay L. Lehnhoff

Project Number
J0323

Project Title
Easy Learning through Educational Subliminal Messages Embedded in Enjoyable Visuals

Abstract

Objectives/Goals
My objective was to see if subjects could be educated through subliminal messages embedded in an enjoyable video.

Methods/Materials
I used a computer program, "Final Cut Pro" to create and embed 1/32 of a second (subliminal) messages into a entertaining video. I also used a VCR and television to transfer the video story onto the computer. The messages were answers to a test on King Henry VII. 140 subjects were asked to take a pre-test. All but the control group subjects watched the video with the subliminal messages. The control group watched the video without embedded subliminal messages. After the video, both subject groups were given a post-test, identical to the pre-test and asked to fill in the answers they now believed were correct.

Results
After analysis, 11% of the control group improved from pretest to post-test, while 34% of the test group improved from pretest to post-test. This data shows a significant difference when subjects were exposed to the subliminal messages as opposed to just guessing (control group).

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Conclusions/Discussion
Most previous research in the area has been focused on proving that subliminal perception exists. My experiment's positive results supports not only that subliminal perception exists but also, my hypothesis that subjects could be educated/obtain knowledge through subliminal messages. Thus, subliminal messages can be an alternative form of education and/or study method that may be used by teachers or students in the future.

Summary Statement
Subjects can be educated through educational subliminal messages embedded in an enjoyable video.

Help Received
Used video equipment at Marshall Middle School under supervision of Media teacher, Michael Wasinski and used computers and computer programs, including Excel in Muriel Gross' science lab. Equipment and teachers mentioned, all at Marshall Middle School, San Diego, CA.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Alice P. Lo

Project Number
J0324

Project Title
Aromatherapy

Abstract

Objectives/Goals
I am trying to discover which odors affect certain moods.

Methods/Materials
Materials

1.Cotton squares
2.Small containers
3.Medium containers
4.Rosemary
5.Juniper
6.Golden Sage
7.Chamomile
8.Terragon
9.Lavender
10.Mint
11. Oil

Testing Procedure

1.Cut plants into smaller portions
2.Put into small containers
3.Leave for 12-48 hours or more
4.Add alcohol (tincture)
5.Put into different bottles

Investigation

1.I shall cut pieces of note cards into smaller squares
2.Put the scent on the piece of paper
3.Have the person smell it
4.Ask the person to fill out the questionnaire

Summary Statement
I am attempting to discover which odors affect certain moods.

Help Received
Mom purchased the herbs and Dad took pictures.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Jose L. Martinez

Project Number
J0325

Project Title
Short Term and Long Term Memory

Abstract

Objectives/Goals
My project goal was to test the short and long term memory spans of 6th, 7th, and 8th graders.

Methods/Materials
To test the short term memory span, I would go to one of the classes. I would give them material to memorize, both in graphic and non-graphical (text and numbers) form. So for example, I would put some graphics on a sheet. I would make a transperancy out of this sheet, and put it on the overhead for fifteen seconds. Directly after that, I would give them a test to see how much they remembered. This would test their short term memory span. Four days after the short term memory test, I would give them another test to see how much they remembered, but this time the subjects would have to write everything they remembered strictly from memory. This tested their long term memory span. This was done with both graphics and text and numbers, so each subject would take four tests.

Results
The results were: 8th grade had the best results on every test, the 7th grade the second best, and the 6th grade the worst. The test that had the best scores was the Graphic Short Term Memory. The test that had the worst scores was the Text and Numbers Long Term Memory. The Graphic Long Term Memory and the Text and Numbers Short Term Memory average scores were about the same.

Conclusions/Discussion
My conclusion proves my hypothesis correct: 8th graders do have the best memory spans. The average scores also seemed to go down with age. The score that had the best scores was the Graphic Short Term, the one with the worst scores was the Text and Number Long Term.

Summary Statement
My project tests the short term and long term memory span using grahical and non-graphical tests.

Help Received
Dr Brent Campbell supplied information for research; Mrs. Marilyn Lauer provided work space.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Ellen L. McGrew

Project Number
J0326

Project Title
Did You See That? Study of Peripheral Vision Reaction Time

Abstract

Objectives/Goals
The objective of this experiment is to see if humans react quicker to peripheral vision or straight vision by measuring reaction time.

Methods/Materials
A vision reaction test device was constructed of a controller, timer device and a fixture. The controller contained a light selector rotary switch, a start switch and a reset switch. The timer device was a trigger using an old joystick and a computer with timer program with interface configured to joystick controller. This timer program was set to track time to 0.001 seconds. The fixture held test subjects head still and kept the alignment of the lights (straight forward, 30, 60 and 90 degrees right and left). Five female and five male test subjects were explained the experiment. Each of seven lights were turned on five times in random order and reaction time recorded for a total of 35 measurements per test subject. Results were tabulated and evaluated.

Results
On average, the test subjects reacted nearly 100 milliseconds faster to light straight in front of them than to that of their peripheral vision. This was also the case for the girl and boy averages separately. There was no significant difference between right and left side vision. There was extreme time variations among the individual test subjects.

Conclusions/Discussion
The results showed that the test subjects reacted quicker to light straight in front of them compared to light in their peripheral vision. Several reasons for this are the anatomy of the eye. Cones in the retina react quicker and they are concentrated near the back of the eye. Also, age variation in the test subjects, as some of the younger test subjects may not have fixed their gaze forward as instructed. Peripheral vision reaction time is important as more computer displays are on glasses and in different fields of vision.

Summary Statement
My experiment showed how reaction time to visual stimulus at various angles of vision can differ.

Help Received
My Science Teacher helped me learn the scientific method and how to apply it to this experiment. My father helped me build the equipment to conduct this experiment and helped format the graphs.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Robyn N. Miles

Project Number
J0327

Project Title
Memory: Can It Be Affected by My "Attitude"?

Abstract

Objectives/Goals
My objective is to scientifically determine that I can influence short-term memory retention by telling the subjects that I either love or hate my project. My project explores the subtle influence that positive and negative attitudes can have on short-term memory.

Methods/Materials
I showed 60 people (each individually) the same 10 unrelated four-letter nouns after which they had one minute to write down the words they remembered. I gave them instructions on what to do without giving an opinion of my project. One third of those subjects were designated as being in the control group, one third as the "negative influence" group and one third as the "positive influence" group. All the subjects were 6th to 9th grade. After showing the first word group, I showed each subject another group of 10 words. However, before showing the words to the people in the "negative influence" group, I gave them negative information about my project by telling them how I hated my project and didn't want to do it. Before showing the words to the people in the "positive influence" group, I gave them positive information and told them how much I loved my project and enjoyed doing it. To the people in the control group, I again gave the same neutral, unbiased instructions as I did when I administered the first word group to everyone. I scripted each experiment so that each person was told the exact same thing as every other person in their experiment group. I practiced the script and memorized it with the same voice inflection and emotion in order to minimize the variables.

Results
The control group, which was given the same neutral instructions both times, remembered exactly the same number of words on both word group tests. The "negative influence" group remembered fewer words after I told them that I hated my project than when I simply gave them instructions on what to do. The "positive influence" group remembered more words after I told them that I loved my project than they did when I just gave instructions on what to do.

Conclusions/Discussion
My hypothesis was correct. My attitude can positively or negatively affect how many words a person can remember in short-term memory. I was able to influence my subjects to remember more or less words by making my project seem more or less worthwhile.

Summary Statement
My project determines that attitude can positively or negatively influence short -term memory.

Help Received
My mother bought the materials for the board and some of the books that I used for research.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Meenakshi T. Mukherjee

Project Number
J0328

Project Title
Do People Remember Color or Black and White Better?

Abstract

Objectives/Goals
I tested if people remember color or black and white (B&W) pictures better and if there would be an effect of age. In order to do this I chose five people from three age groups to test. The first age group was 2-3rd graders, the next group was 5-6th graders and the last group was adults.

Methods/Materials
10 flash cards- 5 cards color 5 cards B&W
15 people to test- five 2-3 graders, five 5-6 graders, and five adults
Step 1- Enroll person in the study
Step 2- Get each person to test separately.
Step 3- Take each card and show it to the person for 30 seconds. Tell them the name of the picture.
Step 4- After you show them all of the cards go through them again this time giving them 30 seconds to tell you the name.
Step 5- Record all of your data from the test.
Step 6- Continue to do this until you have tested five 2-3 graders, five 5-6 graders, and five adults.
Step 7- once done make a graph and table of your data and write your conclusion, future research.

Results
My tables show that 2-3 graders had an average of 6.2 answers correct. They had an average of 2.2 for incorrect answers in color and an average of 2.2 for answers in B&W. The 5-6 graders had an average of 8.4 for answers that were correct and an average of 0.6 for incorrect answers in color and an average of 1 for the answers that were incorrect in B&W. The adults had an average of 9 for answers that were correct overall. They had an average of 0.8 for number of answers incorrect in color and an average of 0.8 for incorrect in B&W.

Conclusions/Discussion
My studies show that 2-3 grader and adults did not remember color over B&W or B&W over color. They were the same averages. The 5-6 graders remembered color over B&W. My hypothesis was half-correct and half-wrong according to these answers. To my surprise the 2-3 graders remembered color and B&W the same and so did the adults. But the 5-6 graders did not. This is why I was half-wrong because I had said I thought that if a child was younger their hippocampus would be smaller so they would not be able to remember as well. The part that I did get correct was that people would remember color better than B&W. The 5-6 graders remembered color over B&W and I find that kind of strange because the other two age groups remembered both the same amounts.

Summary Statement
I looked at the effect of age on memory in color or black and white pictures.

Help Received
Mother helped with the board; Father helped generally

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Reuben S. Navindaran

Project Number
J0329

Project Title
The Effect of Massage Therapy on Blood Pressure

Abstract

Objectives/Goals
I was very interested in mom's work as licensed massage therapist and I wanted to find out whether massage therapy could help to reduce blood pressure for her clients. My goal was to see if there is a significant impact on massage therapy on blood pressure.

Methods/Materials
1. Control Group-
A. Take the blood pressure of the client.
B. Wait for ten minutes so, the client can rest.
C. Then take the blood pressure of the client again.

2. Experimental Group-
A. Take the blood pressure of the client.
B. The massage therapist will massage the client for ten minutes.
C. Then take the blood pressure of the client again.

Materials: Paper, ruler, pen knife, scissor, computer, massage table, moisture cream, pen/pencil, digital blood pressure monitor, construction paper, glue stick, books and towels.

Results
Between the systolic control and experiment and the diastolic control and experiment, the student T-test was 0.48. The student T-test is one way of doing a statistical analysis. This number, 0.48 is very close to zero, which means that the experiment might have happen by chance. The actual number to be proved not by chance is less than 0.05. The number 0.48 is way above 0.05 and is very close to zero which concludes that this experiment happened by chance.

Conclusions/Discussion
Although in this study, massage therapy reduces the blood pressure of a client, the result was not found to be statistically significant both years. The cause of this is because most clients were first time clients and they feel tense and nervous to touch of the masseuse.

Summary Statement
Although in the study of massage therapy, massage therapy reduces blood pressure but, in the experiment the massage therapy did not reduce blood pressure.

Help Received
Mother-massaged clients, Mrs Sniffen-loan the digital blood pressure monitor to me, and Mr Whitaker helped me with my statistical analysis.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Sean M. O'Brien

Project Number
J0330

Project Title
The Effect of Caffeine on Alertness

Abstract

Objectives/Goals
My objective was to find out what effect caffeine would have on the results of a math speed test, relating to both speed and accuracy.

Methods/Materials
I administered three similar, but slightly different 64-problem math tests under three different conditions: 1. without caffeine, 2. after having ingested 54mg. of caffeine (from a can of Mountain Dew soda), and 3. after having ingested another 54mg. of caffeine, totaling 108mg. We timed ourselves on each test and waited 30 minutes after drinking the soda before taking tests #2 & #3. Later I corrected the tests.

Results
The results show that the intake of caffeine helped the participants improve their test performance. The time it took to complete the tests was faster, and the number of errors were lower.

Conclusions/Discussion
My conclusion is that caffeine improves alertness and in moderate amounts can actually help students perform better on tests.

Summary Statement
My project is about how caffeine might effect math test performance.

Help Received
Mother helped conduct experiments, Mrs. Biggers provided math tests for experiments.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Kelsey A. Procter

Project Number
J0331

Project Title
The Relationship between Hand Dominance and Eye Dominance

Abstract

Objectives/Goals
The objective of this project was to determine how whether a person has a dominant right or left hand affects whether they have a dominant right or left eye. It was hypothesized that more than 50% of people with a dominant right hand would have a dominant right eye, and that more than 50% of people with a dominant left hand would have a dominant left eye.

Methods/Materials
The subjects of the experiment were 124 humans. There were two experimental groups. The first group consisted of those humans in the sample population who were determined to have a dominant right hand in a least two of three different tests. The second group consisted of those humans in the sample population who were determined to have a dominant left hand in at least two of three different tests. The control group consisted of the entire sample population of humans. For each experimental and control group, the percent with a dominant right eye and the percent with a dominant left eye were determined.

Results
The experimental results indicated that more than 50%, in fact 67.5%, of the population with a dominant right hand had a dominant right eye. Exactly 50% of the population with a dominant left hand had a dominant left eye. When the results for subjects of the two sexes were separated, the hypothesis still held true, except for the population of males with a left hand. When looking at the sexes separately, the percent of females with a dominant right eye was always a little less than the percent of males with a dominant right eye, and the percent of females with a dominant left eye was always a little higher than the percent of males with a dominant left eye.

Conclusions/Discussion
While there seems to be a correlation between dominant eye and dominant hand, it is definitely far from a one to one relationship. It is clear there are a significant number of people who have a dominant right hand and a dominant left eye. It would be interesting to consider if there is something about differences in male and female development that might be the cause of the slightly increased tendency for females to have a dominant left eye.

Summary Statement
The project investigated the relationship between hand dominance and eye dominance in a sample population of humans.

Help Received

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Kaitlyn M. Shedd

Project Number
J0332

Project Title
Do Advanced Readers Miss More Words than Beginner Readers?

Abstract

Objectives/Goals
A national study found that more than one-third of youths incarcerated at the average age of 15.5 read below the 4th grade level (Project READ, 1978). Statistics like these show the importance of reading research. The researcher's project is "Do Advanced Readers Miss More Words than Beginner Readers?" I did this science project because I wanted to learn more about how reading and the mind works. When I first read this "sentence" I was only able to detect three "Fs" even though I had read all the "of" words. I suspected that other advanced readers would experience the same phenomenon. I thought that advanced readers would have a tendency to disregard the word "of" because it has minimal value or meaning in the English language. Therefore, beginner readers would be more likely to detect the "Fs" more often. I thought this about beginners because they have not read for as long of a period of time and have had less time for their minds to have learned to disregard the word "of" as important. Another aspect that I wanted to analyze in this project was to see if age and time had an effect on the outcome. I chose to do this science fair project because the further knowledge about reading is so important to mankind.

Methods/Materials
Tested 20 beginner readers (5th Graders. Younger readers were unable to follow directions accurately) and 20 advanced readers (Readers for at least 10 years.) Asked the subjects to read the following sentence out loud:

FINISHED FILES ARE THE RE-
SULT OF YEARS OF SCIENTIF-
IC STUDY COMBINED WITH
THE EXPERINCE OF YEARS.

Asked the subjects to count how many F's there are in the sentence. After the testings were done the data was analyzed and evaluated.

Results
After looking at all of the data the researcher discovered that beginner and advanced readers came out the same in detecting the word "of".

Conclusions/Discussion
The statistical analysis of the data collected in this project that tested which group detected the word "of" the best showed the hypothesis was incorrect because the readers of both groups both averaged exactly the same in detecting the letter "F".

Summary Statement
This project was done to research the ability to detect word recognition between advanced and beginner readers.

Help Received
Mother helped type report, science teacher reviewed material, one brother helped with graphs, another brother helped with title page graphics, and my dad encouraged me.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Karis R. Tang-Quan

Project Number
J0333

Project Title
Name That Color

Abstract

Objectives/Goals
Discover the interference color identification has on word. How does the brain react when processing contradicting information? Which task takes priority?

Methods/Materials
stopwatch
50 "interference" flashcards with name of a color written in contradicting color, like "red" written in blue
25 "regular" cards with color spots
25 "regular" cards with names of colors written in black
60 subjects, 30 girls and 30 boys, ages eight to seventeen.
"Regular" cards provided control measurement of normal reading and color identification speeds
4 timed tests
(1) identifying color of the word
(2) reading the word written in color
(3) identifying color spots
(4) reading the word written in black
I varied the order of tests so that no learning effect was introduced by a particular order.

Results
Identifying the color of the word was harder than reading the name of the interference word. All the times were slower, no matter the age or gender. As age increased, time decreased. Girls identified colors and read words faster than boys. With the regular cards, people read the word slightly faster than identifying colors. Reading the word in black was slightly faster than reading the word in color interference cards. Identifying color spots was faster than identifying the color of the word in the interference cards.

Conclusions/Discussion
Identifying the color of the word was challenging. Times were slower because it was harder for people to block out the word on the card. The older the subjects, the lower their times. Girls were faster than boys. However, this might have been due to an age difference because average age of the girls was greater than that of the boys. People can probably read faster than they can identify colors because they read every day. Subjects had the slowest times for identifying the color of the word in the interference cards. Most people identify color of spots easily. But when the color of a word is contradicted by the name of the color word being read, people tend to read the word on the card, and their time is slowed down.

Summary Statement
When the brain is processing contradicting information of word color and word name, interference takes place and color identification slows down.

Help Received
Metropolitan Water District provided the poster board, log book, and binder.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Christine R. Tanguay

Project Number
J0334

Project Title
The Fantasy of Visual Fusion

Abstract

Objectives/Goals
My objective is to develop a better understanding of the contrast enhancement mechanisms of the human eye and brain, and in particular to understand the similarity in behavior that occurs in the color and grey-scale vision systems with respect to the size of the perceived objects within the field of view. Furthermore, I wish to find out where these effects are generated along the path of information flowing from the eyes through the various levels of the brain.

Methods/Materials
Several sets of visual test targets, generated in Matlab and PowerPoint, were presented to human subjects in both grey-scale and color on a large 17" color-corrected computer flat-panel display, using an Apple Macintosh G4 desktop computer. A cardboard divider was used to separate right and left eye images for the image fusion experiments.

Results
The grey-scale lateral brightness adaptation effect was observed over the entire range of object sizes and distances tested, right to the limit of human visual acuity. The chromatic adaptation (color) effect was observed over a nearly identical range of object sizes and distances tested. The variance in observations reported was strikingly reduced by the use of a calibrated computer-driven display, as compared with our previous results using printed targets in outdoor lighting. Most observers were able to satisfactorily fuse the dichoptic image fusion target pairs, and reported the same brightness and color of the two superimposed center squares in almost all cases, demonstrating the elimination of the lateral adaptation mechanism when the central squares and differing backgrounds were not presented to either eye.

Conclusions/Discussion
The minimum fields-of-view for grey-scale and color lateral adaptation are more similar than different, with both grey-scale and color adaptation working essentially all the way to the limits of human vision. This result is unexpected due to the traditional view of the specific mechanisms by which the brain processes grey-scale and color information, and where in the eye and the brain grey-scale and color information are extracted. Furthermore, the mechanisms for lateral brightness adaptation and chromatic adaptation appear to be localized early in the eye-brain information flow, perhaps in the retina itself, in the lateral geniculate nucleus (LGN), or in the first few layers of the lowest level of the visual cortex (V1).

Summary Statement
The effects of lateral brightness adaptation and chromatic adaptation in the human visual system were explored as a function of scale; we have determined for the first time that these effects likely occur early in the human visual system.

Help Received
Father guided student through project, offered suggestions, and helped with the Matlab and PowerPoint programs. Mother solicited volunteers from work to be experimental subjects. Both parents helped with organization and editing of written materials.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
William K.C. Van Iden

Project Number
J0335

Project Title
Making Sense of Amazing Hamsters

Abstract

Objectives/Goals
Can learning time of a maze be reduced by adding stimuli related to the senses of sight, sound, touch, or smell, and if this is true, then which sense will be the most effective? My project is important because it studies the learning process and shows how stimuli can speed up this process.

Methods/Materials
I constructed five different mazes and tested 6 hamsters. Maze #1 was used to determine a learning curve for each hamster from which I chose the control hamsters. Maze #2(Sight) included block markers at each correct turn. Maze #3 (Sound) a bell was rung at each correct turn. Maze #4 (Touch) included clear glue drops along the correct path. Maze #5 (Smell) included a peppermint odor along the correct path. I kept track of total time, time per trial, and the number or wrong turns.

Results
Maze #1 established two control hamsters, one female, one male. Maze #2 (Sight) the hamsters ran 20% faster total time, 7% faster per trial, and made 30% fewer wrong turns. Maze #3 (Sound) the bell distracted the hamsters. Maze #4 (Touch) had mixed results - the controls ran 1.8% faster, but there was no difference in wrong turns. Maze #5 (Smell) most effective - 19% faster total time, 29% faster time per trial, and 50% fewer wrong turns.

Conclusions/Discussion
My hypothesis was correct. Learning time was enhanced by adding stimuli relating to smell. The sight stimuli was the second most efective. It is interesting to note that each hamster made great imporvement in their maze running ability. My research discussed that keeping a hamster in a stimulating environment can increase their number of brain cells. I believe that running these mazes every night has increased their brain. This explains the steady increase in ability for each of the hamsters. Hamsters really are amazing!

Summary Statement
My project uses hamsters mastering a maze to study the learning process and tries to determine which stimuli relating to the senses can be most effective in speeding up this process.

Help Received
Grandfather used electric saw to construct maze pieces.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Kailee R. Wallman

Project Number
J0336

Project Title
Memory Madness

Abstract

Objectives/Goals
The goal of this project was to find out the answer to the problem, which is: Is audio or visual information better remembered? The hypothesis was that visual information is better remembered and better retained by most people than audio information.

Methods/Materials
The materials that were used in this project were the questionnaires, a table, the "visual test" box with the twelve selected objects, a tape player, the recorded tape for the "audio test", pen, and chair/couch. The general procedure was that the subject will be given fifteen seconds to look at twelve objects that are set up in the box. Then, they will write the objects they remember seeing in the box on the questionnaire. After that, the subject will listen to a recorded tape of twelve different objects and write the objects they remember hearing from the tape on the questionnaire. It will then be graded and they will be told whether they remembered audio information better, visual information better, or were equal in both types of information.

Results
The results were that sixteen people out of the twenty-four tested remembered visual information better, three people remembered audio information better, and five people were equal in both audio and visual information. These results were based on the twenty-four questionnaires that were filled out.

Conclusions/Discussion
The hypothesis for this project was that visual information is better remembered and better retained by most people than audio information. Based on the results, this hypothesis can be accepted.This benefits society because people can now start using more visual techniques during the learning experience rather than audio techniques.

Summary Statement
This project tested whether audio or visual information was better remembered.

Help Received
Father helped build visual test display box

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Allison G. Weiner

Project Number
J0337

Project Title
Catch It If You Can

Abstract

Objectives/Goals
This project investigated hand-eye coordination. Hand-eye coordination is the ability to guide with the eyes the movement of the hand. Hand-eye coordination requires all the body to make it work. The brain must receive the information, process it and then send it out to the hand to tell the hand what to do. If hand-eye coordination was better understood then there would be more ways to improve it and peoples' lives could be safer.

Methods/Materials
Eighty people were used in this experiment. There were 10 females and 10 males in the age groups of 7-9, 12-14, 40-50 and 65-80. Each of these subjects were tested for hand-eye reaction time. First the subjects would fill out a questionnaire. Then the subject would sit down in a chair with their dominant hand out. The yardstick would be dropped in between the subject's hand and they would catch it. The yardstick would be dropped twice in between the subject's dominant hand. After the second time it would be measured where the subject caught the yardstick. The same process would be carried out on the subject's non-dominant hand.

Results
As a result of this study, it was found that the 12-14 year old male's non-dominant hand had the quickest reaction time. They had an average of a 16.2cm. reaction time. The females at 12-14 year olds were only 0.3cm. slower than the males. Through this research it was also found that overall the 7-9 year olds had the slowest reaction time, the 65-80 year olds the second slowest time, the 40-50 year olds the third slowest time and the 12-14 year olds the fastest reaction time. Also, through this study it was discovered that in 75% of the groups, the non-dominant hand had a quicker reaction time than the dominant hand. This could have been due to the fact that the non-dominant hand was tested second after the dominant hand. It was also learned that males had a quicker reaction time than the females. The males were only .01cm. quicker than the females.

Conclusions/Discussion
The major conclusion drawn here was that the non-dominant hand had a quicker reaction time than the dominant hand. It was also found that males had a quicker reaction time than females. And finally it was discovered that younger people had quicker reaction times than older or middle-aged people.

Summary Statement
My project is about what factors affect hand-eye coordination.

Help Received
My parents helped me to type my report and helped me to acquire my subjects for the experiment.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Amy L. Winchester

Project Number
J0338

Project Title
What Effect Does Touch Have on the Feeding Habits of Horses?

Abstract

Objectives/Goals
My objective was to investigate if touch had any effect on horses feeding habits. I have 2 horses of my own and they are always eating from a smooth, large tub, and I was wondering if they would mind eating from a small tub with different linings.

Methods/Materials
I started my project by buying buckets, glue, bristle brushes, rubber dish mats, and foam curlers at a local store. Then, I glued these linings to three of the four buckets. My Dad constructed a rack for the buckets and I placed them in the rack in the horses' stall. Next, I placed 1/4 cup of grain in each bucket. I then lead one horse at a time to the buckets and timed them as soon as they started eating the grain. When all grain was gone from the buckets, I stopped the timer. The order of preference and order of finishing was recorded. This was done with the other horse morning and evening for four days.

Results
The results of my investigation were as follows: plain bucket in first place, the rubber lined bucket in second place, the bristle brush lined bucket in third place, and the foam lined bucket in fourth place.

Conclusions/Discussion
After completing my investigation on the effect of touch on the feeding habits of horses, I found my hypothesis was correct. My hypothesis stated that the horses would finish eating from the plain bucket first. Out of eight trials, only seven were completed. The horses preferred the plain bucket over the others, even though the other buckets were not a problem to finish. In conclusion, horses are not as sensitive to touch because they eat around many objects in their everyday life. These objects may include rocks, stickers, or plants not palatable to horses. If a horse wants to eat something it likes, such as grain, being mildly uncomfortable will not affect it.

Summary Statement
Is a horse sensitive to touch when eating?

Help Received
Mother helped put board together, Mrs. Luckin helped oversee project.

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Christopher H. Woo

Project Number
J0339

Project Title
The Art of Mendacity: Verbal vs. Written

Abstract

Objectives/Goals
Every time somebody lies, either while speaking or writing, they exhibit signs in their facial expressions, movements, and so on. My project investigated if people exhibit more signs of lying verbally or in written form.

Methods/Materials
I tested 10 people instructing them to tell 5 lies among truthful statements in both verbal and written 5-minute trials. I recorded the trials with a camcorder. They told me after the tests which statements had been lies. I reviewed the tape, looking for signs shown during lying and recording them on a checklist I made. I calculated the percent of total signs I observed out of all possible signs on the list.

Results
My results showed in each trial that the percent of signs shown verbally was greater than that for written. A t-test showed that the differences were significant.

Conclusions/Discussion
I conclude that people exhibit more signs of lying verbally than when in written form.

Summary Statement
My project is about mendacity and shows that people exhibit more signs of lying when lying verbally than in written form.

Help Received
Used school as a testing facility

CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
Joshua D. Woods

Project Number
J0399

Project Title
The Mystery of Benham's Disk: Comparisons of Perception Due to the Age Process

Abstract

Objectives/Goals
The purpose of my experiment is to find out if a person's age affects how quickly they perceive color. I did this project to show how ones eyes might be affected, as they get older.

Methods/Materials
I made the disk by printing the pattern off the computer (a pattern that was offered from a Benhams disk website) and then glued it onto a circle of cardboard. Next, I placed a Velcro dot on the center back of the cardboard and the opposite dot on the center of a battery operated nail file. I found 80 people (40 seniors and 40 children). Outside, in the daylight, I stood 2 to 3 feet back from each person and told him or her to watch the spinner. As soon as they saw color I asked them to call it out. With stopwatch ready, I said "go". After beginning the stopwatch and spinner, I waited for them to say a color. I wrote down the color they saw, how old they were, and how many seconds it took.

Results
The data showed that the 40 senior citizens had an average response time of 12 seconds. This was slower than 8 seconds, which was the average response time of the 40 children. It was also observed that seniors experienced both the slowest response time (50 seconds) and the fastest response time (.98 seconds).

Conclusions/Discussion
The data that I collected showed that on an average, the children perceived the colors more quickly then the seniors. The seniors average was slower because they have aged. They have used their eyes longer causing them to become more worn out so they do not respond as quickly as those with younger eyes.

Summary Statement
The purpose of my project was to compare how perception changes as a person ages; the data showed that as people grow older, perception slows.

Help Received
My mother helped me type