Name(s)	Project Number
Shruti Aggarwal	**J0701**

Project Title

Is It a Match? Image Resolution and Its Impact on Face Recognition

Abstract

Objectives/Goals
My experiment dealt with the impact of reduced image clarity (grainy and blurred due to still images captured from video) on face recognition, and further examined the relative contribution of the Internal features (eyes, nose, and mouth) and External features (hair, jaw-line) to face recognition.

Methods/Materials
Experiment 1: Use 10 high-resolution color frontal images of different celebrities, normalized by removing the background. Make all 10 images grainy and blurry. Obtain informed consent and test volunteers on each celebrity image, starting from most blurred to the least, and record results.
Experiment 2: Generate 3 additional images with only External features, only Internal features, and only Internal Features spatially displaced, for each of the 10 celebrity images. Make the images grainy and blurry. Obtain informed consent and test volunteers on each of the images, starting from most blurred to the least, and record results. Confirm familiarity with the celebrity by showing the participant the reference set (Original high resolution image).

Results
Experiment 1: Recognition declined to 79% at clarity level 8.
Experiment 2: Internal Features Displaced recognition dropped to 3% at clarity level 8 from 38%. Internal Features alone were recognized at only 34% at clarity level 8. External Feature recognition was 30% at high resolution declining to 15% at clarity level 8.

Conclusions/Discussion
In Experiment 1, most participants recognized 8 out of 10 images. Yet, my research showed most automatic face recognition systems are unable to replicate this performance. So how do humans recognize faces? What is the relative contribution of the internal and external features? What is the significance of the spatial configuration of the nose, eyes and mouth?
Experiment 2's results suggest that under real world degraded image conditions, recognition is more holistic and is served by Internal features and their placement relative to External features. External features are poor indicators on their own but provide the context for the Internal features. This finding can be used to adjust the system algorithms and serve applications related to Biometrics Security for Law Enforcement and Access Control; and entertainment applications such as automatic tagging of photographs.

Summary Statement

I studied how humans recognize images from surveillance cameras and experimented with components of the face to determine their role in recognition.

Help Received

My mom taught me Adobe Photoshop. My teachers permitted me to test students during class.

Name(s)	Project Number
Devon N. Anable	**J0702**

Project Title

Technology: Could It Compromise Human Memory?

Abstract

Objectives/Goals
The objective is to determine if memory is affected by recording information on a keyboard versus handwriting. This study is particularly relevant in today's society, as keyboarding has rapidly become an every day activity for most people. I believe that subjects will remember words better after writing than after typing.

Methods/Materials
Thirty subjects were informed of what I was testing for and completed a total of six trials each. Each trial consisted of 10 four or five letter words, which had been randomly selected from third grade spelling lists and were read out loud to the subjects at 3-second intervals. Subjects recorded the words either by handwriting or typing them and were then given 30 seconds to verbally recall as many words as possible. The data was carefully recorded and analyzed.

Results
Recall was significantly higher for writing trials than for typing. Subjects recalled an average of 6.44 words after writing and 5.86 words after typing. In addition, there was a noted difference in results for adult subjects versus youth subjects, with adults recalling an average of 1.05 more words in the writing trials than in the typing trials, and youths recalling an average of just .13 more words in the writing trials than in the typing trials.

Conclusions/Discussion
The results support the hypothesis that writing helps people remember information better than typing does. Further analysis found that the disparity between words remembered in typing and writing trials was nearly ten times larger in the adult subject group than in the youth group. All of the subjects who expressed a preference for the keyboard were youths and whether or not a subject is comfortable with the mechanics of the note taking does seem to have an effect on their ability to memorize the material and warrants further study. The more complicated processes involved with handwriting were found to aid with memory in both subject groups.

Summary Statement

I want to know if typing effects memory differently than writing does.

Help Received

Parents helped with timing of subjects, Mother proofread write-up

Name(s)	Project Number
Caelin E.M. Batstone	**J0703**

Project Title

Swish: Does Crossed Eye-Hand Dominance Make a Better Free Throw Shooter?

Abstract

Objectives/Goals
I have been playing and watching basketball my whole life. In the 6th grade I entered a free throw competition, and as I looked around at other competitors, I thought to myself, "What makes someone good at free throws?" Is it practice or could it be some special trait they possess? I thought it would be interesting to devise a test to determine the eye-hand dominance of basketball players and then see if those who tested as crossed eye-hand dominance were better at free throw shooting than those who are not.

Methods/Materials
1) I selected 36 volunteers from my current middle school's basketball teams who have roughly the same amount of basketball experience. 2) I determined dominance by asking the subjects to take a paper tube in both hands and look through it to see an object in the near distance. 3) I noted if subjects have crossed eye-hand dominance naturally. 4) The subjects shot 10 free throws using their dominant hand from the free throw line at the school gymnasium and I recorded the the number made and calculated the percentage of shots made. 5) I had the subjects repeat the previous procedure, but this time covering their dominant eye with an eye patch, then a third trial covering their non-dominant eye with an eye patch.

Results
When I compared the average scores between crossed eye-hand dominant and uncrossed eye-hand dominant subjects, crossed eye-hand dominant subjects scored significantly higher on two of the three trials. However, uncrossed eye-hand dominant subjects scored higher when their non-dominant eye was covered. The average scores for this latter trial were even higher - 50% to 43% - than when they were wearing no eye patch at all.

Conclusions/Discussion
Subjects who were identified in being crossed eye-hand dominant scored higher on average than those who had uncrossed eye-hand dominance. When I used the eye patch to force subjects to shoot with their non-dominant eye only, the crossed dominant subjects still performed better. I was hoping that the uncrossed dominant subjects would have performed better when I forced them to use their non-dominant eye to shoot. In fact, they performed best of all when I made them use only their dominant eye to shoot, which is interesting and a possible further research topic!   In conclusion, crossed eye-hand dominance may make you a better free throw shooter but if you're not crossed eye-hand dominant DON'T TRY TO BE!

Summary Statement

How crossed eye-hand dominance affects free throw shooting ability

Help Received

Name(s)	Project Number
Emma R. Freedman	**J0704**

Project Title

Are You Feeling Tangerine? Testing the Correlation between Grapheme-Color Synesthesia and Recognizing Emotions in Faces

Abstract

Objectives/Goals

My project tests the correlation between symbol-color synesthesia and accuracy in recognizing emotions in faces (emotion recognition).

Synesthesia is like a sixth sense and senses are tools. This particular tool helps synesthetes have a more in-depth understanding of complex information like a facial expression so synesthetes may be able to use this to help them excel in this area. I hypothesize that there is a positive correlation between symbol-color synesthesia and recognizing emotions in faces.

Methods/Materials

For this test I used two online instruments. The first was a standardized synesthesia battery to categorize subjects into two groups and one untested group: Tested Synesthetes, Tested Non-Synesthetes, and Untested (control) which gave each subject a score, >1.0 non-synesthetic and < 1.0 synesthetic. The second instrument was based on a standardized test that measures synesthetes# emotion recognition ability, which scores I compared between groups.

I e-mailed and posted both of the instruments on three online communities: synesthesia discussion boards, emotional intelligence forums, and a third community unrelated to either of these.

Results

In both of the analyses the grapheme-color Synesthete group overall had more emotion recognition accuracy. However, not all synesthetes did well, in fact, some scored very low. In addition, the Synesthetes were not consistently accurate between the eight different emotions that were tested.

Conclusions/Discussion

The purpose of my experiment was to see if there was a positive correlation between symbol-color synesthesia and emotion recognition accuracy. I hypothesized that there is a positive correlation between grapheme-color synesthesia and emotion recognition accuracy. I found that, as a group, the synesthetes did better but as individuals they either scored very high or very low thus, proving my hypothesis partially true and posing new questions that may lead to further studies in this field.

Summary Statement

I found out that symbols-color synesthetes are either much better or much worse at recognizing emotions in faces, as compared to non-synesthetes.

Help Received

Name(s)	Project Number
Fiona Hall-Zazueta	**J0705**

Project Title

The Effect of Screen Background Color on Reaction Time

Abstract

Objectives/Goals
The objective of this experiment is to determine the effects of screen background color on computer users' reaction times.

I hypothesized that when a green background is displayed computer users will have faster reaction times and when a red or yellow background is displayed computer users will have slower reaction times.

Methods/Materials
A program was written using the Scratch 1.4 programming environment on a Macbook Pro. The program displayed F and J on various colored backgrounds and recorded the time it took test subjects to type the appropriate letter. 35 test subjects from the Orchard View School community ranging in age from 8 to 75 participated in the study.

Results
A black background resulted in the slowest or second slowest reaction time for more than half of test subjects. A yellow background resulted in the fastest or second fastest reaction time for more than half of test subjects. Reaction times for all other colors were within 20 milliseconds of each other.

Conclusions/Discussion
My hypothesis was shown to be incorrect, however screen background color does have demonstrable effects on computer users' reaction times. One potential source of error was the learning curve of the program. Some users clearly became more proficient at using the program as the test progressed.

Summary Statement

My project shows the effect of six different background colors on the reaction times of computer users.

Help Received

Name(s)	Project Number
Mifrah Hayath	**J0706**

Project Title
Who Is Driving Ahead in the Memory Lane?

Abstract

Objectives/Goals
(1) To find out whether or not a child's memory is better and more accurate than an adult's memory.
(2) To find out if adults and children remember pictures, numbers, symbols, songs, and sayings better than they remember words.
(3) To find out whom adults and children think has a better memory.
(4) To find out if a particular gender has a better memory.
(5) To find out if the number of languages spoken has an effect on memory.

Methods/Materials
Randomly surveyed 50 adults and 50 children in 23 cities. Showed, sang or called out 10 items and then asked them to write these down in the order shown to them. Whoever, adults or children, remembered more items irrespective of the order in which the items were shown, would prove to have a better memory. Whoever, adults or children, remembered more items in the correct order in which the items were shown, would prove to have a more accurate memory. Materials used were survey forms, flash cards, watch, pencils and writing boards.

Results
(1) Children scored 459 points and adults 416 points when remembering items irrespective of order and 338 versus 330 points when recalling in order.
(2) Items rememebred most by both adults and children were pictures (98%), numbers (97%), and items they were more interested in (92% of adults and 96% of children).
(3) Both adults (68%) and children (86%) thought children had a better memory.
(4) Average memory score was 15.50 for males and 15.38 for females.
(5) Average memory scores for 1, 1.5, 2 and 3 languages spoken was 14.79, 15.50, 15.77 and 16.43.

Conclusions/Discussion
(1) Hypothesis proven that the memory of a child is better and more accurate than an adult's memory.
(2) Adults and children remember pictures, numbers and things they are more interested in more than they remember words.
(3) Majority of both adults and children thought children had a better memory.
(4) Difference between average memory scores of males and females was too little to conclude that a particular gender has a better memory.
(5) The greater the number of languages spoken, the better the memory.

Summary Statement
My project aims to find out who amongst adults and children has a better and more accurate memory.

Help Received
Parents drove me to libraries for research and public places for surveys and guided me with Excel.

Name(s)	Project Number
Caitie M. Incledon	**J0707**

Project Title

Reading to Remember

Abstract

Objectives/Goals
Do students remember what they read better when they take notes or draw a diagram?

Methods/Materials
I used two reams of copy paper and ten large envelopes.

Results
Experimental Group 1 (those who drew a diagram) answered an average of 15.39 questions correctly out of 25. Experimental Group 2 (those who took notes) answered an average of 19.69 questions correctly out of 25. The Control Group (those who only read the article) answered an average of 18.54 questions correctly out of 25.

Conclusions/Discussion
My hypothesis was not correct. I learned that the students who took notes did better than those who drew a diagram or did nothing else.

Summary Statement

I tested 6th, 7th, and 8th graders to see if drawing a diagram or taking notes helps students learn better.

Help Received

Mother helped me come up with the quiz, my teacher helped me getting consent forms back.

CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

Abraham N. Jellinek

Project Number

J0708

Project Title

Click Here

Abstract

Objectives/Goals

My goal was to test where people click on a web page by creating a mock news website and instructing the users to click on the first interesting thing they saw, then storing the information in a database and analyzing the results.

Methods/Materials

Materials: A MacBook computer, Fraise, a text editor, 1&1 web hosting, MySQL database software, Email/Facebook.

Methods: I started by creating a simple page that would log information to a database. Then, I downloaded the source code of the WIRED site. I modified the page to log the URL of a link to a database when you clicked any of the links. It wasn't working, so I troubleshooted it, and found out it was a typing error. I created an introduction page, telling people to click the first link they notice on the next page. They would click continue, and it would bring them to my WIRED-alike page. I sent out email asking people to send it out to people they know, and tell them to take my experiment. Over 100 people had done my experiment, so I backed up the database. I analyzed the data, and made graphs.

Results

I had 108 people do my test, and almost 50% of them clicked in the upper-left. Another 20% clicked on the upper-right sector of the page. This supports my hypothesis, that most people will click on the upper-left sector of the page.

The terms "above the fold" and "below the fold" originated with newspapers. They now mean #above or below, respectively, the section of the page that is not visible without scrolling". According to Robert Hoekman, Jr., this is because people are habituated to reading the important articles at the top of the page, and less important ones below the fold.

Keeping this in mind, the seven people who scrolled to the bottom of the page are probably outliers, and this could be for a few reasons:

Didn#t follow the rules

Were using a small screen

Were using a very large screen

Conclusions/Discussion

Most people who read from left to right will click the upper-left link, because it#s naturally where the eye goes when you#re reading. This means that if you#re designing a Web page that has important content, it should go somewhere in the upper-left sector of the page. There are different ways that I could have

Summary Statement

The traditional arrangement of text on pages influences where web site users are most likely to click in digital content.

Help Received

Susana Wessling, who helped me with my board and report, Herb Jellinek, who helped me with the technical aspects of my project, and everyone who took my test.

Name(s)	Project Number
Julia M. Jencks	**J0709**

Project Title
Tapestry in Your Mind

Abstract

Objectives/Goals
To test for the age group that had the highest amount of synesthetes.

Methods/Materials
1. Surveys
2. Test subjects
3. Camera for documentation
4. Pen or pencil to record data
5. Paper to record the data
1. Research synesthesia and create a survey or find one that you can use.
2. Print copies of the survey, about 180 of them but it depends on how many people you are testing.
3. Pass out survey and let the people take them.
4. Collect surveys.
5. Separate them into categories, i.e. age, gender, or dominant hand.
6. Organize the data into graphs and determine the amount of synesthetes in each age group.
7. Find which age group has the most people that tested positive for synesthesia.

Results
My results show that there are three eleven year olds with synesthesia, eight twelve year olds have synesthesia, six thirteen year olds, and three fourteen year olds. I have found that the most twelve year olds tested positive for synesthesia.

Conclusions/Discussion
My hypothesis is incorrect because my results show that twelve year olds have tested and shown that they are synesthetic. During this project I have learned that there is a secret neurological phenomenon that many people have in our school, and that this phenomenon can open a whole new door in the students# life. My favorite thing that happened during my project was watching the students# faces as they found out why they saw colors around them when other people didn#t. My favorite case was when Joel Villavicencio found out he was synesthetic, you could see a look in his eye that said he was seeing colors right then and that he knew what it was. I was overjoyed when I found out he had synesthesia because he was the first person I tested and I wasn#t sure if I had tested right at first. I would probably change when I did my project because I waited until the last minute. I would also make it a little more complicated and exact by testing with the stroop test. I think that when you apply for college and careers, you should be tested for synesthesia because first, you can probably take classes that would help you understand about

Summary Statement
To test for the age group that had the highest amount of synesthetes.

Help Received
Mother bought all supplies; Father painted board; Dr. Derek Arnold at the University in Queensland answered my questions on synesthesia; Mrs. Wendi Rodriguez answered my questions on how to set my project up; All my participants who made this possible

Name(s)	Project Number
Grace Koplin; Zoey Lyttle	**J0710**

Project Title

Sparks Fly

Abstract

Objectives/Goals
Our goal is to test if the students would focus more on the tests when they exercised. When someone exercises oxygen circulates through the brain, and oxygen is proven to increase focus. Also, during exercise the brain produces a substance much like Serotonin, which allows you to focus more intently.

Methods/Materials
Our materials were the math tests that were administered to the 6th grade class. We graded them and gathered all of the data. The math tests are the key to our project, without them, our project would be a blank board.

Results
Our summary of data showed that when people exercised and truly increased their heart rate they didn#t perform better than when they didn#t exercise.

Conclusions/Discussion
From our collected data our conclusion is that exercise does not improve a student#s focus on tasks that require concentration.

Summary Statement
Our project is to find out if exercise improves a student's focus on tasks requiring concentration.

Help Received
The 6th Grade Teacher conducted the exercises and the tests

Name(s)

Kevin B. Krick

Project Number

J0711

Project Title

Kids vs. Adults: Frequency Perception

Abstract

Objectives/Goals
In my science fair project, I wanted to see whether or not kids could hear better than adults.

Methods/Materials
What I used to conduct this project was my laptop computer, and fifty people per group (kid/adult). I tested the kids and adults for this project by playing the frequencies 500 HZ, 1000 Hz, 5000 Hz, 10000 Hz, 15000 Hz, and 20000 Hz for each individual, while asking whether or not the subject heard what was played after each frequency.

Results
Kids and adults had equal ability to hear the frequencies up to 5,000 Hz. After that point, 100 percent of the children heard up to 10,000 Hz, 96 percent heard up to 15,000 Hz, until only 22 percent could hear 20,000 Hz. 92 percent of adults could hear up to 10,000 Hz, and 34 percent could hear 15,000 Hz, while 0 percent could hear 20,000 Hz. That means that at the 10,000 Hz mark kids performed 8 percent better than adults. At 15,000 Hz, kids performed 62 percent better, and at 20,000 Hz kids performed 22 percent better.

Conclusions/Discussion
I concluded from the results that kids could hear better than adults. Kids performed better than the adults from 10000 Hz to 20000 HZ, which is a majority of the frequencies i played.

Summary Statement

In my project, I tested if kids could hear better than adults or vice versa.

Help Received

Name(s)	Project Number
Hafsah A. Lakhany	**J0712**

Project Title

Point, Set, Match: Can Visual Perceptual Therapy Help Master the Art of Observation?

Abstract

Objectives/Goals
The goal of my experiment is to determine if visual perceptual skills can be trained using the card game SET, and to compare taught skills to skills developed from one's own experiences (which would be assessed using the Symbol Digit Modalities Test)

Methods/Materials
In order to conduct my experiment, I recruited two fourth grade classes from my school. The students were already randomized into two classes; Section A (the experimental group) and B (the control group). I began by administering the SDMT (Symbol Digit Modalities Test) as a pretest to both groups in order to assess their initial level of visual perception. Next, both groups participated in an interactive tutorial for the visual perception game SET. After that, both classes were divided into three equal sub-groups. Each sub-group was provided with the card game SET. Members of the control group were simply asked to play the game. Members of the experimental group on the other hand, were provided with strategies as to how to master the game, while they were playing the game SET. This procedure was repeated for a total of 8 trials over a period of 5 weeks. After the completion of the training, both groups took the SDMT again (as a post-test) in order to determine if their level of visual perception was enhanced.

Results
By conducting this experiment, I realized that sharp observational skills are not attained by improving one's vision, but by training one's visual perceptual skills. I also found that visual perceptual skills did improve with therapy, and subjects who were taught strategies performed better on the SDMT, than those who learned on their own, thus confirming both my hypotheses.

Conclusions/Discussion
After conducting my experiment, I found that visual perception can be enhanced by manipulating the way one perceives something visually. I achieved this by providing my subjects with visual perceptual therapy in the form of the game SET. SET provided them the training needed to improve visual perceptual skills, which was proven with the scores on the SDMT before and after the training.

Summary Statement

The main aim of my experiment is to determine if visual perception can be enhanced with visual therapy, along with manipulating the way one perceives things visually.

Help Received

Dr. Lisa Edwards guided me throughout the process; Subjects' parents allowed the participation of their children; Fourth grade teachers allowed me to use their class time for my experiment.

Name(s)	**Project Number**
Ria Angelica T. Laxa	**J0713**

Project Title
Colored Thoughts

Abstract

Objectives/Goals
To determine if the color of text affects a person's memory. I hypothesize that the color of text affects a person's memory by catching his/her attention and making him/her more aware of it, enabling the word to be easier to recall.

Methods/Materials
This experiment was conducted on 70 middle school students, ages 11-14 years, at Sacred Heart Academy. Each volunteer read an original short-story that contained 9 words in colored print. Then he/she was asked to recall any words from the original short-story. The words recalled were classified and counted as either colored print or black print. The results were calculated in percentages.

Results
54% of the volunteers remembered more colored than black print words   (colored > black). 30% remembered more black than colored print words (colored < black). 16% remembered an equal amount of both (colored = black).

Conclusions/Discussion
The coloring of text enhances a person's memory. When words are in colored print, they are more easily recalled because the colored words will draw a person's attention and make him/her more aware of that specific word or phrase. It is possible that the activities of the temporal and occipital lobes are enhanced by color causing increased visual memory. On the other hand, this result should be interpreted with caution because for some people, the colored words may actually be a distraction, thus making the words harder to remember. However, in most cases, this study may be helpful as a learning tool for students, as well as individuals with learning disabilities such as Dyslexia, and the elderly who may have a decreasing memory resulting from Alzheimer's.

Summary Statement
My project was to see if the color of text would affect a person's memory.

Help Received
Mother helped type report; Older brother helped gather subjects/volunteers

Name(s)	Project Number
Patrick J. Manghera	**J0714**

Project Title

Does Number Sense Develop with Age?

Abstract

Objectives/Goals

My objective was to determine the affect age has on automatic number sense. Based on my 2010 results, this year I focused more on fast questions that require no reading and very quick responses. Also, the 2010 experiment indicated a possible difference in genders, so I specifically analyzed skills of boys versus girls in number pattern questions.

Methods/Materials

This year I created a PowerPoint to control response time and reading demands by putting the directions on one slide and showing the picture or number pattern on the next slide. Given in a traditional classroom, individual students answered on a separate piece of paper. This year, I only focused on two skills: visual recognition and number patterns. I tested 22 2nd-grade students, 29 4th-graders, 31 6th-graders, 32 8th-graders; using the same subjects, I compared results of 62 males and 52 females. I analyzed the results for accuracy answering visual recognition and number pattern questions.

Results

My results determined that number sense does improve with age and there is a difference in automatic number sense between males and females. The 8th grade average correct (53.1%) was significantly higher than the 2nd grade average (25.9%). In a linear fashion, 4th and 6th-grade averages were better than 2nd(34.8% and 47.7% respectively). When comparing males to females (regardless of age), males averaged 45.6% correct to females at 37.3%. The most significant differences, whether addressing age or gender, was the number pattern category. Regarding age, the second grade averaged 0.5 out of 5 correct while the 8th grade earned an average of 3.4 out of 5.0. Comparing boys to girls, the boys averaged 2.5 while the girls averaged 1.7 on the same questions.

Conclusions/Discussion

Adding to the innate vs. learned debate, my experiment showed that the number sense skill of pattern awarness does improve with age, and therefore can and is learned through experiences. Therefore,identifying children with a weak number sense early can be helpful to enhance this skill. The experiment further indicates a natural difference in males vs. females, which validates one theory of brain differences between the genders set through the evolutionary process. Perhaps teachers should teach patterning differently to the two genders so both comprehend the relationship of numbers.

Summary Statement

I tested 114 students at grades 2, 4, 6, and 8 to determine that automatic number sense does improve with age;males clearly have a more natural ability than do females.

Help Received

Mother helped edit my writing and tested her 8th grade students. She also helped cut and glue the board.

Name(s)	Project Number
Christopher J. Paghasian	**J0715**

Project Title

Einstein, IQ, and Violins

Abstract

Objectives/Goals

My objective was to determine if playing music versus not playing music prior to an IQ test affected an individual's score on it, and if so, if there was any detectable variation between various instruments. I hypothesized that playing a musical instrument would positively affect scores, and that the piano would do the best at raising IQ test scores.

Methods/Materials

I used two equally difficult, altered IQ tests and gave one to musicians before and one after they played music for 15 minutes. Each test was timed for 5 minutes. A control group was used to determine whether or not both IQ Tests were equivalent. Sudents from the Montery Youth Orchestra and the International School of Monterey were tested in this experiment.

Results

According to my experiment, there is a slight increase in scores before and after tests, though it is not significant. The guitar had the highest difference in average scores, with a 2 point increase between each tests' average score. The guitar group's average scores for the first test were 4, and the second 6. Trumpet did the worst, with a 1 point decrease between each tests' average scores. The trumpet group's average score for the first test were 6.5, and for the second 5.5. In all, there was a 5.75 average for the 1st test, and a 5.93 average for the 2nd test, which was a 3% increase.

Conclusions/Discussion

My results contradicted my hypothesis, because the final average of the test before and after barely changed. My project also proved that those who played guitar had the highest increase in scores.

Summary Statement

My science fair project determined whether or not there was a short term effect of playing a musical instrument on one's IQ test score, which was proven untrue, and which instrument would do the best at raising scores, which was the guitar.

Help Received

Robin White helped with research ; Mother helped to read over report; Ms. Vanisha Evans Douvon helped arrange time to test the Youth Orchestra; Larry Granger conducted the Monterey Youth Orchestra between tests; Ms. Elise provided instruments for individual tests.

Name(s)

Kinsey L. Purcell

Project Title

The Mystery Box

Abstract

Objectives/Goals

The objective of this study is to determine which gender can best identify the 3-dimensional mystery shape inside a masked box the most accurately. I hypothesized that males would tend to do better than females because of previous research indicating that males of this age scored higher on 3-dimensional puzzles as well spatial orientation and mathematical problems.

Methods/Materials

General Materials: 1)Board for science fair (standard foam), 2)Binder (7.5 cm), 3)Plastic sheets, 4)Pencil (#2), 5)Paper (lined, and white), 6)Science fair notebook,
7)Computer, 8)Printer, 9)Microsoft Office and Excel, 10)Sharpies, 11)Eraser
12)Glue/adhesive, 13)Flash Drive, 14)Research material (neuroscience).
Testing Materials: 1)4 boxes (card board,lid,15 x 5, 2)4 hollow 3D shapes; heart, circle, triangle, & trapezoid (depth is 4.5 cm, 12cm x 10 cm).

Results

This study examined the ability of males compared to females to determine the identity of a complex 3-dimensional shape hidden in a mystery box. Forty 8th graders were examined. The results showed that when given a heart shaped puzzle, that females accurately identified the shape 40% of the time and males scored an accuracy of 50%. When given the circle shape puzzle, the females to males were 70% vs 55%, When given the triangle shaped puzzle, the females to males accuracy was 45% vs 80%, and the trapezoid identification accuracy for females to males was 50% vs 50% , respectively. It was also noted that males were more accurate at identifying shapes that did not contain sharp edges. With regards to the overall identification, it was found that females were on average accurate 51% of the time and males were accurate 60% of the time.

Conclusions/Discussion

This experiment revealed that on average 8th grade male test subjects were able to more accurately identify a complex three-dimensional mystery shape hidden in a plain cardboard box than 8th grade female test subjects. Males scored an accuracy of 60% compared to the females accuracy of 51% when the data was collected on mulitple choice questionnaire. During the early design of this experiment, the test subjects were not given a multiple choice questionnaire and resulted in extremely poor accuracy in mystery shape identification. Therefore, it was decided to provide the test subject with a multiple choice questionnaire for more accurate percentage of correct answers.

Summary Statement

This project is about the difference between genders in 3-dimensional spatial problem solving skills.

Help Received

Father helped me research the background information on the brain. Mother helped assist with some minor typing and editing.

Name(s)	Project Number
Ethan Rasmussen; Liam Scott-Curtis	**J0717**

Project Title

A Test on Chess: Chess Perception

Abstract

Objectives/Goals

The objective is to determine if a glass chess set or a wood chess set will allow your brain to detect more possible moves in different scenarios. Our hypothesis is that a wood chess set allows your brain to detect more possible moves because there is a greater contrast of the colors than on the glass chess set.

Methods/Materials

One glass chess set ("Set 1"), one wood set ("Set 2"), and two recording books. 12 games were played, 6 on Set 1, 6 on Set 2, with players alternating colors. Moves thought and moves played were tallied by each player and then were converted into unit ratios. These numbers were averaged for each player in each arrangement (e.g., player 1, set 1, "white"), then averaged over both players to show a unit ratio of moves thought to moves played at each possible playing station.

Results

Players saw more possible moves thought per move played on the Set 1 (glass) than Set 2 (wood). Playing Set 1 (glass) white had a unit ratio of 2.16 and black was 2.29. Playing Set 2 (wood), white had a unit ratio of 1.51 and black was 1.44. For Set 1 (glass), player 1 and player 2 showed big differences. Player 1 was 2.72 for white and 2.7 for black. Player 2 was 1.59 for white and 1.8 for black. For Set 2, their differences between players weren't large. Player 1 was 1.59 for white and 1.49 for black. Player 2 was 1.45 for white and 1.39 for black.

Conclusions/Discussion

Our hypothesis was wrong. We thought it would be easier to detect more moves on Set 2 (wood), but we detected more moves on Set 1 (glass). The biggest problem is that this experiment only applies to player 1 and 2. We could have used more people to get more data with a wider variety of chess players. Our results might be useful for chess players. For example, maybe inexperienced players shouldn't choose glass because they might get overwhelmed with the number of moves thought, so there is a larger possibility that they will choose the wrong move. Experienced players might benefit from seeing more possible moves.

Summary Statement

We used a glass and a wood chess set to study whether the brain detects more possible moves on a set with higher color contrast.

Help Received

Mrs. Macy helped us schedule our work; our parents drove us to each others' houses to play chess, took pictures and helped us condense our abstract for this application.

Name(s)	Project Number
Idalis Y. Rivera-Ramirez	**J0718**

Project Title

I Said Red, You Said Blue

Abstract

Objectives/Goals
The objective is to determine if the Stroop Effect will change the way human subjects process mixed colored signals, when using people who have no known ailments in comparison to those who have ADHD/ADD or Dyslexia.

Methods/Materials
Time each individual by showing them the first test and having the person say the colors that they see as fast as they can. Then record the amount of time that it took them to successfully say the colors. Repeat this for Test 2 and Test 3. Record and compare the ADHD/ADD subjects, Dyslexic subjects and the control group results. The materials utilized were a stopwatch, paper, a pencil and three Stroop Effect tests. I tested 15 people in three separate categories to total 45 test subjects ranging in age from 10 to 50 years. The categories were people diagnosed with ADHD/ADD, people diagnosed with Dyslexia and a control group with no known ailments.

Results
The results from Test 1 using colored rectangles showed that test subjects with ADHD/ADD averaged 5.17 seconds, test subjects with Dyslexia averaged 6.83 seconds and the control group with no known ailments averaged 4.76. The results from Test 2 using the words written with the same color ink as the word, had test subjects with ADHD/ADD averaging 6.06, test subjects with Dyslexia averaging 8.38 and the lowest score of 3.82 was by the control group. The results from Test 3 showed that the test subjects with ADHD/ADD averaged 10.38 seconds to complete the test. Test subjects with Dyslexia had the highest of all the times tested with an average of 14.94. The control group with no known ailments had a low average of only 8.55 seconds.

Conclusions/Discussion
The results supported my hypothesis because the subjects with ailments were unable to process and recognize the information as quickly as those with no known ailments. I felt that the test subjects that had known ailments did not do well because they had difficulties with distractibility, disorganization and frequent switching between the tasks. I came to this conclusion because of their facial expressions, body movements, and constant glances at the stop watch. This caused them to have slower reaction times. By using this information teachers can better understand their students and adjust how they teach students with such ailments. These results also helped me understand how my brother (diagnosed with ADHD), handles mixed signals.

Summary Statement

By testing and comparing people with ADHD/ADD, people with Dyslexia and a control group with no known ailments, I found out how ailments affect how the brain handles mixed signals.

Help Received

Name(s)

Jonathan E. Schiffer

Project Number

J0719

Project Title

Mind Your Distractions

Abstract

Objectives/Goals

I found the topic of distractions interesting as well as very current and relevant to today's society. Today's youth are grasping the technological wave by vigilantly checking Facebook, texting friends and playing game systems, often at the same time they are trying to complete homework and study for tests. So, my goal was to test the theory by examining how varying levels of distractions affect a student's ability to complete math problems and memorize items timely and accurately.

Methods/Materials

Thinking Test - In a quiet controlled environment, I tested 12 subjects ability to timely and accurately complete a 100 problem math worksheet measuring speed and accuracy. Each subject was tested 3 times with the first time having no distractions and then manipulating the level of distraction with low and high level questions while they completed the worksheets.

Memory Test - I tested 12 subjects ability to recall 10 random items in a shoebox in 1 minute measuring accuracy. Each subject was tested 3 times with the first time having no distractions and then manipulating the level of distraction with low and high level questions while they memorized the items in the shoebox.

Results

Thinking Test - My findings matched my hypothesis. On an average, the tests with low distractions caused the subjects to spend 39% more time to complete the math problems than tests given to them with no distractions and 60% more time to complete with high distractions. The average number of minutes to complete the 100 math problems was 4:20 with no distractions, 6:23 with low level distractions and 7:35 with high level distractions.

Memory Test - My results show that the existence of distractions reduced their ability to recall the items in the box. The average number of items recalled correctly was 9 with no distractions, 6 with low level of distractions and 6 with high level of distractions. With the existence of low level distractions my subjects only remembered 67% of the number of items that they had previously recalled with no distractions.

Conclusions/Discussion

In conclusion, completing homework or studying is more likely to reach maximum success without distractions. Although some people have the ability to handle the distractions, most do not and can be at a significant detriment. I believe this is a valuable lesson for students to be successful.

Summary Statement

I experimented how varying levels of distractions affect one's ability to remember and learn.

Help Received

Father administered the thinking and memory tests on me.

Name(s)	Project Number
Molly M. Shine	**J0720**

Project Title

The Effect of Monocular Vision vs. Binocular Vision on Optical Illusion Perception

Abstract

Objectives/Goals
The objective of this experiment was to measure the effect of monocular vision versus binocular vision on optical illusion perception. The hypothesis was that if the subject's dominant eye was covered then optical illusion perception would be different than if both eyes were uncovered.

Methods/Materials
Ten different black-and-white optical illusions were placed one at a time in a shadow box. Over three different days, twenty 4th grade girls were studied. Each was asked to state her dominant hand (19 right handed and 1 left handed). One half of the students were each asked to cover their dominant eye for the test. One-by-one each student was brought into a separate room, shown the ten illusions, and asked what the subject saw in each. The answers were recorded on a data sheet.

Results
The test results showed that all the students were more successful at seeing the illusions that attempted to trick the viewer into seeing something that wasn't present. These same students were less successful at viewing the illusions that had two different pictures in the same illusion.

The ten students that used both eyes were 18% more successful than the ten students using only one eye (the other being covered). Thus, the hypothesis was accepted as correct.

Conclusions/Discussion
While the experiment showed the common sense opinion that two eyes see better than one, the differences measured were less dramatic than the researcher expected. As a student who has worn a patch over one eye for half of each waking day, the researcher was pleased to find that the lowering of successful results was less than one might expect.

This experiment, and similar experiments, will over time lead researchers to measure more accurately the differences in monocular versus binocular vision, and to find the causes and cures of the various eye problems, which should result in the improvement of the care and treatment of eye conditions which limit the use of one eye.

Summary Statement

This experiment investigates how patching affects the minds ability to recognize the uncertainies of optical illusions.

Help Received

Mother helped layout board; Father helped set up spreadsheet.

Name(s)

Rebecca H. Strull

Project Number

J0721

Project Title

Stroop Artistry: Effect of Color Aptitude on the Stroop Test

Abstract

Objectives/Goals

The primary objective was to test whether people who use color artistically or practice a lot with color are able to overcome conflict between color and word. I tested this using the Stroop Test, a word reading, color naming test of how the human brain processes information.

Methods/Materials

I had 54 subjects take three timed Stroop tests- control, word, and color. Eight of the subjects earn a living using color, such as professional artists, interior designers, and painters. In the control test, the words and the ink colors matched, and the subject read each word aloud. In the word test and color test, the words and the ink colors did not match. In the word test, the subject read the words aloud, and in the color test, the subject named the ink color of each word aloud. I collected additional information about the subject, including a rating of their artistic use of color, gender, and age.

Results

When controlling for age, subjects with higher artistic use of color had less difficulty with the Stroop test, so therefore were able to partially overcome the conflict between color and word. On average, the difference between their times on the three tests were less than that of the other subjects.

Conclusions/Discussion

This experiment tests the response time of the human brain in processing information, in this case words and colors. When presented with a conflict between color and word, the word comes faster to the brain than the color, because reading words is an automatic response. That is, you unconsciously (or automatically) read a word when you see it, but it takes controlled effort to name the color that you see when that color is in conflict with the written word. These results suggest that recognizing color for people who have a high aptitude for color is more of an automatic task than it is for the rest of the population.

Summary Statement

My project is about whether people with a high aptitude for color can overcome the conflict between color and word in a Stroop test, illustrating that tasks become automatic with practice.

Help Received

Parents helped me learn how to graph in Excel, answered questions about research studies in science journals, helped glue papers, and proofread

Name(s)	Project Number
Ami U. Thakrar	**J0722**

Project Title

Picture This!

Abstract

Objectives/Goals

The objective of this experiment was to discover if pictorial illustrations assist children in reading comprehension, and if so, which reading proficiency (below-proficient, proficient, or advanced) most benefits from these illustrations.

Methods/Materials

The materials I used in my experiment were two grade level readings - one with illustrations and the other without. Each reading came with 10 cohesive reading comprehension questions. My sample size was 55 fourth-grade students. I had the teacher categorize the pupils into three categories based on the reading proficiency listed in their state testing scores from the previous year. The students were not told which category they belonged too. Each child took both tests independently in a quiet setting. The tests were not timed. Half of the students in each reading proficiency were administered the test without illustrations first, and the other half were administered the test containing illustrations first.

Results

I found that for below-proficiency readers, there was a mean test score improvement of 8.57% when illustrations were used. For proficient readers, there was a meant test score improvement of 6.84% when illustrations were used. For advanced readers, there was a mean test score improvement of 8.67% when illustrations were used.

Conclusions/Discussion

My hypothesis was proved partially correct. I had hypothesized that pictorial illustrations, when added to a grade-level reading, would improve reading comprehension in all reading proficiencies, which was proved true. I had also hypothesized that these illustrations would most benefit below-proficiency readers because they tend to have more difficulty with visualization; however, it was the advanced readers that most benefited from the added illustrations. The results from this experiment can be used worldwide. With these results, teachers can help their pupils learn reading and reading comprehension in the most beneficial and effective manner.

Summary Statement

The purpose of my experiment was to discover if pictorial illustrations improve reading comprehension.

Help Received

None

Name(s)

Meagan Yuen

Project Title

The Nose Knows: Does Scent Enhance Work Efficiency?

Abstract

Objectives/Goals
The objective is to determine if scent affects work efficiency. I hypothesize that scent does affect work efficiency.

Methods/Materials
Informed consent was obtained from 33 eighth grade students and their parents. Randomized multiplication sheets (2 tables through 9 tables) containing 100 problems each were created using Microsoft Excel. There were five different tests over five days: a control, a placebo (subjects were told there was a scent in the air when there was not), eucalyptus spermint, vanilla, and lavender. Each day, subjects were given 60 seconds to complete as many problems as possible. The tests were graded by the number of problems that the subjects attempted to do and the number of problems correct.

Results
Every manipulated test showed better scores than the control. However, the eucalyptus scent ranked lower than the placebo, contrary to research. The vanilla and lavender scents showed the highest scores.

Conclusions/Discussion
It seems that scents do improve work efficiency. However, results show an upward trend when placed in chronological order, so the improvement may have do to do with practice. In support of my hypothesis, the vanilla scent (fourth day) showed higher accuracy and a higher median score than the lavender scent (fifth day).

Summary Statement

To test if scents affect or enhance work efficiency, timed, randomized multiplication tests were given to a class of 33 eigth grade geometry students in a scented room.

Help Received

Parents and classmates helped to grade tests; Father created randomized multiplication sheets; Mother helped log scores; used classroom and students of Mrs. K. Nishimoto.