

Abstract: Science and Engineering Fair of Houston

1033

AI in Mental Health

Angelina Castro
Arlene Perez
Weis Middle School

Category

Behavioral and Social
Sciences

During our investigation on if AI helps people with mental health issues, we realized that AI does in fact help with mental health. Even though we found out that it did help with mental health we also had some issues that we had while we were using the website. We noticed that the AI wouldn't give an accurate response or it wouldn't give the response wanted. We had to ask the humans that did the survey more questions than we thought so that in the end it would give us an accurate and wanted response. We had no problems that had put us behind not including it not giving a wanted response in the end.

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- human participants potentially hazardous biological agents
 vertebrate animals microorganisms rDNA tissue

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- yes no

4. This project is a continuation of previous research.

- yes no

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- yes no



Abstract: Science and Engineering Fair of Houston

1034

Adios Ants

Crystal Huynh
Mia Iraheta
Alief ISD

Category

**Behavioral and Social
Sciences**

It can be very irritating to deal with ant invasions. As much as a chemical repellent would work well, they are expensive and often dangerous for people and the environment. Because of this, we decided to test some natural ant repellents that can be made from materials found at home such as limes, cinnamon, and coffee grounds. We tested the repellents by drawing out a circle, placing ten ants in it, and placing the repellent being tested in the middle. Each repellent got three ten-minute trials with ten new ants each trial. At the end of the experiment, we were able to determine that cinnamon was the most effective natural ant repellent because it repelled the most ants out of the circle. Several things interfered with the results such as ants dying, other insects interfering with the test ants, and ants attempting to defend themselves. In the future, we would choose a different method of experimenting and we would measure how well the repellents worked in another way.

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Abstract: Science and Engineering Fair of Houston

1035

How Does Music Affect Cognitive Performance?

Zoey Zaragoza

SST - Champions College Prep - MS

Category

**Behavioral and Social
Sciences**

My project is "How Does Music Affect Cognitive Performance?". The project I am presenting is about finding out how different types of music affect a person's type of cognitive performance. I chose this project because every time I want to study I want to listen to music, but every type of music I try to listen to distracts me. Another reason I chose this specific project is because I am really interested in the brain and cognitive performance in a person. In this project I have conducted an experiment to see which music is good for a certain age group's cognitive performance. Cognitive performance is based and worked on inside the brain in the limbic system. Creating this project is to show that different types of music can really change a person's behavior and focus. The music a person listens to has many different effects, whether it's a human or an animal. Music can change their behavior based on the genre. My topic is important so that when a student is struggling to focus they can play a type of music and be able to focus and be aware of what they're doing. Now knowing that music can affect our brains and help us focus we can use it in our daily lives.

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Abstract: Science and Engineering Fair of Houston

1036

How do Pictures affect Memory? Insight on the Picture Superiority Effect

Suniska Samanta

Conroe ISD /McCullough Junior High

Category

Behavioral and Social
Sciences

Words can be overwhelming and confusing, especially when studying. People can struggle to comprehend and understand notes, especially dyslexic people. Scientifically, it has been proven that pictures can enhance memory, so if you added pictures to your daily notes, it could help you remember the material better. I wanted to see if that was true, so I tested it. One group took a test after studying with pictures, and the other without. Once the results came in, I found that the group that studied with pictures did almost 10% better. This proves the hypothesis correct, meaning that people could apply this technique into their notes to improve their grades.

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Abstract: Science and Engineering Fair of Houston

1037

Art Makes Me Cry

Avery Turco

Clear Creek ISD /Seabrook Intermediate School

Category

Behavioral and Social
Sciences

When creating a piece, artists have a specific message in mind, but when art is observed, many messages can be taken from it. This is where the idea that art is subjective comes from. Conclusions are made from the viewer's opinions which can result in art being taken in a completely different direction from which it was intended. This experiment was designed to test the hypothesis that music would have the largest amount of people who understand its message. Five surveys were created, each the exact copy of the others, except for the subject piece, which was a different art form. Each form was sent out to twenty people and once the surveys were taken, they were scored based on accuracy. When the experiment was completed, it was found that it was in fact poems that had the highest accuracy out of each art form. The results found that songs had the third highest accuracy of the five subjects. Thus, the hypothesis that music would have the highest amount of people who understood its message was not supported.

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Abstract: Science and Engineering Fair of Houston

1038

Yawning Empathy Connected

Madalyn Roden

Clear Creek ISD /Seabrook Intermediate School

Category

**Behavioral and Social
Sciences**

The project How does different levels of empathy affect the contagiousness of yawning? And the hypothesis If people with different levels of empathy are tested, then family members would have the most empathy and therefore have the more contagious yawning was chosen because this was a very fascinating topic an almost nobody knows the answer to why yawning is contagious. The project was performed by taking one person from a categories asking them to look and listen to me read and then I would yawn in the middle of reading and start a stopwatch and then stop it when they yawn. The data proved my hypothesis correct family members do not take long to yawn after me but strangers took longer than all of them. So in total family members are the quickest to react to a yawn is what I learned from my project. Some real-word uses for this experiment is that you have a stronger connection to family then to strangers or classmates/coworkers. It could determine how a connection in the mind can cause different reactions around different people. This proves that the mind can affect the things we do around different people who have different levels of empathy.

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Abstract: Science and Engineering Fair of Houston

1039

Which gum brand last the longest?

Katherine Vicente

SST - Champions College Prep - MS

Category

Behavioral and Social
Sciences

The purpose of my project is to see which gum brand lasts its flavor the longest. When I present my project I would have all the data in the board. the experiment about my project was that I bought 3 different brands of gum, I chew each gum at a different time and I used a stopwatch to record the time until the taste was gone to each gum. After finishing my experiments the time I got for each gum I went to my data and put the final time I got off each gum. finally after putting my data in I started checking the time of each gum and by seeing which one had the the longest time that would let me know which gum brand last their flavor the longest. This is basically the process of my experiment of gums.

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check all that apply):

human participants

potentially hazardous biological agents

vertebrate animals

microorganisms

rDNA

tissue

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yes

no

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yes

no

4. This project is a continuation of previous research.

yes

no

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yes

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yes

no



Abstract: Science and Engineering Fair of Houston

1040

Can color affect memory??

Violet Washburn

Clear Creek ISD /Bayside Intermediate School

Category

**Behavioral and Social
Sciences**

The reason I am seeing if color can affect memory is because if color can affect memory, (positively) we can use that to our advantage. I used two papers, one with normal black and white sentences. The other with highlighted and colored letters, we asked each subject to memorize the information as much as possible. The result was that color did affect memory, however not positively. In conclusion, people were less likely to remember words from the colored paper. My research shows that memory was more impacted by age than color of text. My recommendation is to ask subjects what the main idea of the sentences were about.

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Abstract: Science and Engineering Fair of Houston

1041

Study of Various Solutions to Cell Phone Addiction

Sivapriya Kannan

Conroe ISD /McCullough Junior High

Category

**Behavioral and Social
Sciences**

Phone addiction is becoming a bigger and bigger problem, especially now. I am experimenting with five different solutions to it in order to conclude which one is most effective in several distinct variables of the negative effects of phone addiction. Some of these include anxiety/depression, insomnia, poor school performance, inability to enjoy quality time with friends/family without a phone, decreased focus, etc. The solution groups I have created are based on 5 different methods I researched: strict scheduling, mental acknowledgement, physical steps, school/friend related, and visual/built-in techniques. I hope to generate self-awareness about the harm phone addiction does and to provide my solutions for it.

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Abstract: Science and Engineering Fair of Houston

1042

Music and Mood

Rhylee Merchant

Houston ISD /BCM Academy at James D Ryan - MS

Category

**Behavioral and Social
Sciences**

I chose this topic because music has always had a big impact on people's everyday life and then I started thinking why does happy upbeat music always makes me feel like I can do anything. How does listening to happy upbeat music in the morning affect your mood when you are getting ready for school? If you listen to happy upbeat music in the morning then it will make you feel energized, happy, and positive because it motivates people positively and it always makes me feel like I can do anything and I will have a good day. Music has been proven to boost your mood and energize you. Music can also improve your mental focus, reduce stress, and make you happier. According to the Harvard Health Journal "Bright and cheerful music can make people of all ages feel happy, energetic, and alert and music may even have a role in lifting the mood of people".

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- yes no



Abstract: Science and Engineering Fair of Houston

1043

The Neuroscience of Music and Its Effects on Autism

Aaryan Hussain

THE HONOR ROLL SCHOOL - MS

Category

**Behavioral and Social
Sciences**

My project, titled "The Neuroscience of Music and Its Effects on Autism," explores how music influences the relaxation of autistic children compared to non-autistic children (ages 3-20). The research question asked was, "Does music help autistic children relax and remain calm compared to non-autistic children?" My hypothesis was that autistic children would achieve greater relaxation and calmness when listening to a background medley of classical, piano, rock, jazz, instrumental, country, pop, and other genres, compared to non-autistic children. The purpose of this research was to understand how music could support relaxation in autistic children because autism often involves challenges with emotional regulation, and music tends to offer a tool to help children with these difficulties. The project focused on understanding whether music therapy might assist in reducing stress and improving emotional balance in autistic children. Materials for this research included scholarly articles, books, and studies on the neuroscience of music and its effects on brain activity, as they were central to this research. This research also involved reviewing studies on how music impacts stress levels, emotional regulation, and relaxation in children with autism. Also, the project used line, bar graphs, scatter plot, and formulas to demonstrate the effectiveness of music therapy on autistic children to improve their focus, relaxation, and emotional well-being. The independent variable in this research was whether the child listening to the music was autistic or non-autistic. The dependent variable was the level of relaxation observed in the children. The controlled variable was the musical medley played, which remained consistent to observe the impact of music on autistic and non-autistic children. This study concluded that music may significantly help autistic children by promoting relaxation and enhancing emotional regulation, offering valuable insights into therapeutic approaches.

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Abstract: Science and Engineering Fair of Houston

1044

How does a type of music influence heart rate and a person's anxiety levels?

Muhammad Kabani

Fort Bend ISD /Fort Settlement Middle School

Category

Behavioral and Social
Sciences

In this project you will see that my original hypothesis was not entirely correct. Additionally you will see that there is a connection between anxiety and genres of music. The purpose of my project is to examine if various types of music influence an individuals' heart rates and subsequently impact their anxiety levels. I believe that varying tempos of music influence individuals' heart rates. For instance, an upbeat genre of music will elevate an individual's heart rate, whereas a calm and steady genre will reduce a person's heart rate. This knowledge will assist in discovering a method to use music for treating anxiety. In this project, I will utilize a heart rate monitor and a volunteer as they complete a survey. This survey will include 6 songs from various genres. Following each song, there will be two questions inquiring about their feelings and what genre they believe it belongs to. They will undergo individual testing without being informed of the song, and I will read the survey to them. Following each individual, I will collect their information and create a bar graph, which will help me reach a conclusion. This study is worthy of importance because the data that can be found relating to this topic may help relieve symptoms of depression that is common in patients with heart disease, or decrease a person's anxiety and help them feel more confident, have a better quality of life, or be able to cope with challenges more effectively.

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Abstract: Science and Engineering Fair of Houston

1045

The Ice Cream Project

Houston Pryor
Weis Middle School

Category

**Behavioral and Social
Sciences**

Blue Bell has often been referred to as the Texas ice cream or the best ice cream in Texas. Some even suggest it is the best ice cream in the nation, but is this true? Vanilla ice cream is considered the 2nd favorite ice cream flavor in the United States with the first being neopolitan. Putting this "best ice cream in Texas" theory to the test, participants taste tested three brands of vanilla ice cream, identified if they were confident they could identify blue bell, which flavor was their favorite, and which they thought was blue bell. Results show that 11/15 participants were confident they could identify Blue Bell, 9 out 15 people did prefer Blue Bell and 14/15 were able to successfully identify which ice cream sample was blue bell.

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Abstract: Science and Engineering Fair of Houston

1046

Music and Your Heart: How Sounds Affect Your Blood Pressure

Vladyslava Kovpashko
Central Middle School

Category

Behavioral and Social Sciences

I really love music, and helping people, so in this project, I decided to use music and a blood pressure meter to see what types of music lower blood pressure so I can see what types of music calm down, and lower the blood pressure for people who have high blood pressure. There are many people, especially elderly, who have high blood pressure, which causes their heart to work even harder to pump blood, so in this project I'm gonna find the solution to this problem. At first, I made several volunteers of different age groups listen to 6 different types of songs, and measured their blood pressure before and after. After lots of testing, from my experiment I found out that the music that lowers blood pressure the most was classical music, which met my expectations on this project, and the music that raises blood pressure by a lot is rock music which is really interesting. In conclusion, listening to classical music helps you calm down and lowers your blood pressure the best.

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Abstract: Science and Engineering Fair of Houston

1047

More interaction a little More life: Life with or without activities!

Danari Provost

Houston ISD /BCM Academy at James D Ryan - MS

Category

Behavioral and Social
Sciences

Mental health is an emerging aspect of educational life among middle schoolers in America, with many factors affecting how students behave, feel, and pursue academic activities. I examined how middle schoolers felt overall and what factors influenced this using Quality of Life. I used the Kidscreen-27 instrument to examine the health-related Quality of Life of 38 middle schoolers randomly selected over one week in November 2024. My results showed that despite having a moderately high Quality of Life, middle school students very often felt lonely and seldom felt that their parents treated them fairly; however, they also felt that they always had fun with friends in school and were moderately motivated to do things and got on well at school. Students may feel isolated despite having a good Quality of Life, and this has implications for school managers to have closer monitoring and implement programs to improve specific aspects of the Quality of Life indices of students.

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Abstract: Science and Engineering Fair of Houston

1048

Finding Your Rhythm: Circadian Awareness and Student Wellness

Angeline Amy Akshitha Umaganth
Central Middle School

Category

**Behavioral and Social
Sciences**

This study aimed to investigate sleep-wake patterns in a group of students. Participants completed the Morningness-Eveningness Questionnaire (MEQ). Among the 30 participants (aged 12-15 years), three distinct sleep chronotypes were identified: morning type, moderate morning type, and undefined type, based on sleep onset time, sleep efficiency, sleep latency, and total sleep time. Students classified as "undefined" exhibited significantly higher MEQ scores compared to the other groups. With 66.6% of participants categorized as "undefined," these findings suggest a prevalence of inconsistent sleep patterns in this population. These irregular sleep habits may have detrimental effects on overall well-being and daily functioning. Addressing these sleep issues could potentially improve student health and academic performance.

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- yes no



Abstract: Science and Engineering Fair of Houston

1049

How music affects mood ?

Isabella Richards

SST - Champions College Prep - MS

Category

**Behavioral and Social
Sciences**

The purpose of my project is to see how music affects the mood of a human. I would like to know how it affects mood because many people listen to music on a regular basis. Also, music in some ways can be very harmful. In my investigation to see how music affects mood, I have seen that my hypothesis was incorrect. I see this because I said that music has a bad effect on emotions and I have learned that my hypothesis was incorrect. My data shows that even tho some music may have different effects on different people, that does not have to mean the music is bad or has a bad effect on a person's emotions.

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Abstract: Science and Engineering Fair of Houston

1050

Bamboo vs. Traditional Paper Towels: How Do They Compare?

Roshin John

THE HONOR ROLL SCHOOL - MS

Category

**Behavioral and Social
Sciences**

I will measure the absorbency of bamboo and paper towels on different liquids, using 3-4 different paper towel brands. I will also calculate the cost per sheet of each brand, in order to compare costs. Pictures and graphs will be included for visual evidence, as well. Finally, I will create a summary of the initial hypothesis, experimental process, and conclusions.

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Abstract: Science and Engineering Fair of Houston

1051

Analyzing ASMR and sleep

Bailey Edwards

Houston ISD /BCM Academy at James D Ryan - MS

Category

**Behavioral and Social
Sciences**

The purpose of me doing this project is because I sometimes have the TV on to make myself go to sleep faster. I decided to research this topic to see if playing ASMR videos would make me fall asleep faster than normal. My question was, "Does listening to ASMR before you go to sleep help you go to sleep faster?" To test my hypothesis, I had my mom start the videos as I went to bed. She set the timer from her phone to see how fast I would fall asleep based on the type of ASMR video that was showing. She recorded how many minutes it took me to fall asleep based on the videos. Based on the results, the videos that had less talking are the ones that I fell asleep on faster. My main findings were that AS

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Abstract: Science and Engineering Fair of Houston

1052

Effectiveness of Bellows Breath in Counteracting Stress

Sahasra Vellore

Conroe ISD /McCullough Junior High

Category

Behavioral and Social
Sciences

Anxiety and stress are two raging epidemics that conquer the world. According to the "National Alliance on Mental Illness," over 40 million people in the U.S alone experience anxiety or stress. It has been evident that many solutions were sought out to prevent and stop these mental disorders such as medication, including SSRI and SNRI, psychotherapy, meditation, and good nutrition. But, above all of this, what effect does Bellows' Breath have in reducing stress levels? Bellows' breath is performed by sharply breathing in through the nose, while shooting arms above the head and bringing them down as the person exhales. The person must exhibit a hissing sound to achieve a deeper breath. Due to the heavy diaphragmatic breathing, the Vagus nerve, a key player in the parasympathetic nervous system, is triggered. Therefore, the PNS is activated. When the PNS is activated, heart rate goes down, the mind becomes clear, leaving you feeling less anxious or stressed. To achieve accurate results of the effectiveness of Bellows' breath, I conducted my experiment on my basketball teammates before try-outs and on my sister's dance troupe before their performance. They recorded their heart rate on a pulse oximeter before and after Bellows' breath while also writing how stressed they feel on a scale of 1 to 10. After conducting my experiment, the results showed an astonishing number of positive participant experiences. 94% of participants experienced a reduction in heart rate, 2% felt an increase, and 4% had stagnant results. 80% of participants reported that they felt less stressed after the technique. The remaining 20% did not feel a change in their stress level. A stagnant or increased heart rate and stress level could be because of the way the person does the technique. If performed incorrectly or without the deep hissing breath the results would be skewed. In conclusion, if a person does Bellows' breath, then their heart rate and stress will be reduced.

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Abstract: Science and Engineering Fair of Houston

1053

Anonymity, A Missing Family Tree, A Study of People Facing This Reality

Luke Lipari
Conroe ISD /Irons Junior High

Category

Behavioral and Social
Sciences

Abstract The first objective of this project was to establish societal views about being donor conceived (DC), and comparing those views to lived experiences of DC adults to determine if society's beliefs aligned with or differed from those of DC people. A summation of the hypothesis was that society's views differ from the experiences of DC people. Survey questions were answered by Non-DC (societal sample) and DC adults. Utilizing a 5% margin of error, the hypothesis was correct. One large differential observed was in response to whether there are ethical issues with donor conception to which 56% of the societal sample and 98% of the DC sample responded yes, a 42% difference. There were differential outcomes ranging between 7% and 74% for other responses. The second objective of this study was to substantiate whether there are psychological impacts to DC people as a result of being DC. It was hypothesized that there are psychological impacts. This was tested via survey questions designed to explore this in-depth. Data analysis proved the hypothesis correct. The results showed definitively that there are psychological impacts from being DC. Mental health conditions that began or were exacerbated from being DC were reported on. The data proved that factors, such as age of disclosure of DC status, significantly impacted psychological outcomes. All findings indicate that DC people are at high-risk. However, society does not understand the difficulties they face. Until this changes, adequate resources to aid them will not increase. This must be rectified for their well-being.

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Abstract: Science and Engineering Fair of Houston

1054

Does Color Affect Taste

Angy Kenfack

SST - Champions College Prep - MS

Category

**Behavioral and Social
Sciences**

Does color affect taste? That was the question that this project set out to answer and the answer is yes color does affect taste. I tested it using 2 different variables and the results were the same if you look at the data table you will see the results that I got and if you look at the graph you will see the results that a scientist got when testing the same experiment. So in conclusion this project confirmed my hypothesis was correct and that some marketing companies use the colors and alleged flavors to trick you.

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Abstract: Science and Engineering Fair of Houston

1055

THE ICE CREAM PROJECT CHOCOLATE ADDITION

Ryan Pryor
Central Middle School

Category

**Behavioral and Social
Sciences**

Bluebell holds a special place in the hearts of Texans, but is it truly the favorite? A comparative taste test was conducted between Bluebell and two other popular ice cream brands to determine if taste play a significant role. The results show that most of participants preferred Kroger brand ice cream. I chose my topic because I always thought that Bluebell Ice Cream was the Texas favorite ice cream, and I wanted to test that theory. I got three flavors of ice cream put them in different containers that are color coded and asked a series of three questions. 1. Are you confident you can identify which sample is Bluebell ice cream? 2. Which sample is Bluebell? 3. Which sample is your favorite.

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Abstract: Science and Engineering Fair of Houston

1056

What factors affect time perception?

Callie Dai

Fort Bend ISD /First Colony Middle School

Category

Behavioral and Social
Sciences

I created a questionnaire designed to figure the main factors that contribute towards the human minds perception of time. Using my computer, I did some research to determine what main factors were primarily responsible for how fast we think time goes by. With doctor approval, I created a survey for all ages 10 and up and sent the survey to my contacts and people I know. Participants including middle schoolers to seniors took my survey for my project. As my conclusion, I've found the type of person most likely susceptible to fastest perception of time and the person most susceptible to the slowest perception of time.

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Abstract: Science and Engineering Fair of Houston

1057

Does sleep affect academic performance

Marina Hopper
Weis Middle School

Category

Behavioral and Social
Sciences

I am doing this project because I want to help solve the problem of kids having bad grades and / or they are struggling with math. Does the amount you sleep affect your academic performance? The procedure is Sleep for 2 hour Wake up and do the math sheet. Go on with your day. At night sleep 8 hours Do the math sheet. At the end calculate to see which score is higher. I was correct because the 8 hour score was higher. The score was higher by 30 percent. With the 8 hour being a 90percent and the 2 hour being a 60 percent.

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Abstract: Science and Engineering Fair of Houston

1058

Peer Pressure At All Ages

Lucas Parker

Conroe ISD /Irons Junior High

Category

**Behavioral and Social
Sciences**

The purpose of this experiment was to find out which age and gender was most likely to give into peer pressure. To do this I needed people in three different age groups and the groups divided into males and females. I asked 6 preteen girls, 6 preteen boys, 6 teen girls, 6 teen boys and 6 post teen girls and 6 post teen men to be a part of our experiment. We met outside of our church and I took each group into a prepared location where all but 1 person sat down. That 1 person was then sent on a fake mission to sign a form while I could instruct the other members sitting about what I needed them to do. I had made flashcards with 4 lines on them. The first line was the control line and the idea was to find the matching length line. I told them that the person on the left will look at flashcards and tell the truth for the first few flashcards while everyone copied whatever that person in the first seat said. On trial 10 and 11 the far left individual told the truth. The other 9 flashcards, the individual was asked to lie and everyone follow suit. By this time of the instruction, the individual would have just made it back to the group and everyone settled in to the deception. As the trial began, the subject being tested would be pressured to give in to their peers to deny their own eyes to fit in. However, our study showed that the pre teen girls were the only age to give in to the peer pressure and did so on 4 of the trials. This is significant and important to the world because we now understand that pre teen girls are more susceptible to peer pressure whether its good or bad and this can give us a hint or warning to parents that their pre teen girls are more likely to give in to peer pressure more than their preteen boy, teenage boy, and teenage girl. That is helpful to know which age group is more likely to give in to peer pressure. In conclusion, this experiment was very interesting and has given us a good idea on how peer pressure is dealt with in different ages and genders. This can give the world an idea of which age group and gender is more likely to give and not give into peer pressure.

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- yes no



Abstract: Science and Engineering Fair of Houston

1059

Smell The Difference

Serenity Morrow

Houston ISD /BCM Academy at James D Ryan - MS

Category

**Behavioral and Social
Sciences**

This study looked at whether certain scents in the environment could make bitter flavors more tolerable. To test this, participants were asked to taste dandelion tea and green tea, which were chosen to represent bitter medications. They tried the teas in two settings: one without any added scent and one where the room smelled like bubblegum. The results were surprising. In the neutral, scent-free setting, people rated the taste of dandelion tea at 2.6 out of 10 on average. But with the bubblegum scent in the air, the rating jumped to 6 out of 10. Green tea also improved, going from 4.2 to 6 out of 10. Many participants said the sweet bubblegum smell helped mask the bitterness and made the teas taste much better. This suggests that scents can influence how we experience taste. It could even have practical uses, like helping people take bitter medicines more easily—especially kids or anyone who struggles with strong flavors. Future studies could look at different scents and how they pair with various tastes, or explore whether this approach could improve medication habits over time.

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Abstract: Science and Engineering Fair of Houston

1060

Does Breakfast Affect Our School Productivity?

Hayden Nguyen

SST - Champions College Prep - MS

Category

**Behavioral and Social
Sciences**

My science fair project topic is 'Does Breakfast Affect Our School Productivity?' The purpose of this project is to help my peers and I improvise on ways to better our school performance. To find the most accurate results of my project, I performed thorough research, and used data from questionnaires that were handed to many of my peers. My questionnaire included 3 main questions, which were if the participant ate breakfast on the majority of school days, the participant's mood after finishing their breakfast, and a range of the participants' grades to find out the school performance aspect of my project. After completing all of these categories, I found that breakfast has a positive impact on the participants that usually ate breakfast, while a negative impact on participants that didn't.

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Abstract: Science and Engineering Fair of Houston

1061

Who's A Melomaniac

Kenneth Clarkson

Clear Creek ISD /Creekside Intermediate School

Category

**Behavioral and Social
Sciences**

My project will be to improve the state of mind of others through togetherness and bonding with another person. I will make a foundation upon which we can build relationships. In my project, I will interview sixteen participants by playing clips of songs from six different music genres. Then they will be asked to give me their opinion on each from questions such as, "Did you like the song," or "How could you connect this song to your life." I will create a table within Microsoft Excel and generate a statistic rate for each detail. I want to take the music a person enjoys and be able to understand at least something about their culture. Understanding where we come from will help us control where we are going. This will lead to a much brighter future.

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Abstract: Science and Engineering Fair of Houston

1062

Social Battery

Abigail Locklin

Clear Creek ISD /Seabrook Intermediate School

Category

**Behavioral and Social
Sciences**

This project is to prove the point that social media can be the cause of many adolescents obtaining a bad mental health for example, depression, anxiety, and also suicidal tendencies. This project is important because one of the main reasons for teenage suicide has been shown to be social media whether it is because of bullying, body shaming, etc. The problem being tested is the effect social media has on peoples' moods and it was predicted that if people are shown negative social media posts, then their mood will be lowered. Fifty people took a survey with negative social media posts while another fifty took a survey with positive social media posts. They were asked their mood before and after viewing the posts on a scale from 1-5 (1 being the worst and five being the best) and the change in their mood was recorded. The average difference for negative social media posts was -1.84 and the average difference for positive social media posts was +1.14. This data shows that the negative posts had a stronger impact on peoples' moods than the positive posts did. This results for this project show the effect social media had on peoples' moods. The results prove the hypothesis to be true and proved the point for this project to take place.

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Abstract: Science and Engineering Fair of Houston

1063

Can music benefit studying?

Thalia Meza

Ayden Gaona

SST - Champions College Prep - MS

Category

Behavioral and Social
Sciences

Have you ever wondered if the secret to better grades could be hidden in your playlists? Well, research suggests that the right music can boost your focus, helping you pass tests with a little rhythm in the background. Research suggests that the right music can boost concentration, reduce stress, and enhance memory. For example, instrumental music like classical can promote relaxation and mental health. The 'Mozart effect' shows that listening to Mozart's music can temporarily boost problem-solving and thinking skills. Studies also show that the genre you choose could be the key to more effective study sessions and better memorization. In conclusion, this topic shows how music can improve study efficiency and focus.

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Abstract: Science and Engineering Fair of Houston

1064

The Stress Test

Elizabeth Woodring

Lara Louise Peetermans

Clear Creek ISD /Seabrook Intermediate School

Category

**Behavioral and Social
Sciences**

The thinking behind this project was what students go through on a daily basis. They are expected to get all of these good grades on test, while some people are just bad test takers. Teachers and especially parents have such high expectations for their kids. A lot of kids are stressed out because of school and also tests. This project will test what classroom environment makes the students heart rate go up more and gives them a higher level of anxiety on tests. The hypothesis stated that whenever different stressful testing environments are tested, then students in a stress-free environment will have a lower heart rate. This was tested by having four groups of students all taking the same test, but in different environments. Before and after they took the test, their heart rates were measured. The hypothesis was incorrect, the participants in the calmest group had higher heart rates then the students in the most stressful environment. The students in level 3 had the highest heart rates, level 1 had the second highest bpm. After that was level 4, and finally with the lowest bpm, level 2. This shows that surprisingly the least stressful level 4. The participants had the lowers heart rate in this level.

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Abstract: Science and Engineering Fair of Houston

1065

The Color Conundrum

Navika Agarwal

Saanvi Gopal

Fort Bend ISD /Fort Settlement Middle School

Category

**Behavioral and Social
Sciences**

Students often lose focus during class, missing key information needed to complete assignments. This project is based on the Stroop effect —when contradiction of the meaning of the word over the color of the font, occurs leading to conflicting thoughts. This study focused on students from the ages of 11-14, the middle school population, to figure out if certain colors could catch the students' attention more than others. The study began with an introduction of our topic to the participants and then we obtained the participants' approval. Later, they were shown Canva slides with contradicting word and font colors while quickly naming the color correctly and being timed with a stopwatch. Then the data consisting of the time and number of attempts was recorded in a Google Sheet. After the results were averaged, blue was the most attention-catching color with a response time of 1.39 seconds. We also noticed that average times differed with colors. This directly relates to our alternative hypothesis that colors have an effect on attention span, especially the color blue. This research can be used by educators to increase engagement with course work through the usage of colors. This research can help further researchers looking into the relationship between colors and cognitive responses in diverse areas of study.

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Abstract: Science and Engineering Fair of Houston

1066

How Does Multitasking Effect Short-term Memory in Adults Ages 50-79?

Ibrahim Mamedov

Houston ISD /BCM Academy at James D Ryan - MS

Category

Behavioral and Social
Sciences

Older adults already have a disadvantage in cognitive skills due to age but they live in a society that celebrates multitasking. The project is about how multitasking affects short-term memory in older adults, who experience troubles with their memory. Previous research has shown that multitasking had a negative effect on short-term memory. 30 adults aged 50 to 79 years completed a short-term memory test while multitasking with news videos and pop music. The short-term memory consists of flashing letters on the computer monitor, and the amount of letters flashed increased by two every single trial. The sequence of conditions was changed every 5 participants. The results show that although the short term memory test scores of people multitasking with pop music (77.57%) and news videos (77.97%) were lower than those with no multitasking (82.23%), from a statistical standpoint they were not significantly different. Multitasking does not significantly affect the short term memory of older adults. Previous studies found that heavy multitasking significantly impairs short-term memory. However, this research suggests that light multitasking, like background noise from music or news, has no significant effect. My findings suggest that older adults can continue multitasking without a significant effect on their short term memory skills, and future considerations should examine longer-term effects to see whether multitasking can be beneficial.

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Abstract: Science and Engineering Fair of Houston

1067

A Bold Impact: Formatting's Effect on Reading Comprehension

Caleb Adams

Conroe ISD /Knox Junior High

Category

Behavioral and Social Sciences

Reading is an essential skill to develop, as that is how our society conveys information. However, some individuals struggle with reading and comprehending the material. In a junior high school setting, students read presentations, textbooks, math problems, etc., and are expected to retain the information. In this experiment, important phrases are bolded, italicized, highlighted, or left normal to see if the format helps individuals more effectively capture important information. If the test subjects answer more questions correct on the passage with bolded words than normal words, then bolded words have a higher comprehension rate. Thirty test subjects each read four different passages at the same reading level. Each subject was randomly assigned one passage in each of the different formats: normal, bold, italics, and highlighted. The normal text had no changes to the font, the other passages had important phrases bolded, italicized, or highlighted. After reading, they answered seven questions before moving on to the next passage. The results were compiled into a spreadsheet for analysis, and the comprehension scores for each text format were averaged to calculate overall test scores. The findings revealed that the bold format yielded the highest comprehension rate, with an average score of 85%. Highlighted followed closely with an average score of 83%. Normal received a score of 82%, while italicized had an average score of 79%. This data indicates that bold text leads to a higher comprehension rate than other formats. Therefore, if educators incorporate bold text formatting into their materials, students may achieve greater success.

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Abstract: Science and Engineering Fair of Houston

3022

Music Manipulation

Aydan Rodriguez

Colton Wazdrag

Pablo Daniel Sada Tijerina

Conroe ISD /ASHP: Academy for Science and Health Prof

Category

Behavioral and Social
Sciences

With brands and companies fighting and fighting doing any big or little things to persuade customers or compete with opponents. With this there are many things the human eye can't see, like the strategy of incorporating music in advertisements which is what this project is about. To test this two ads are needed both in a foreign language so nobody is swayed by words. One of the ads will include music(Group A) while the other is just the words(Group B). Group A listened to the video which entailed music and answered a question if they would buy the product advertised which was ice cream. Group B followed all the same steps and had an identical advertisement just without music. The results from group A was that 75% of participants would've bought the product and 45% from group B would have bought the ice cream. Just these numbers alone can tell you music has an enormous influence on a customers decisions. After this experiment you can come to the conclusion why companies use music in advertisements. This process could make thousands to millions of dollars of revenue for whoever uses it.

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Abstract: Science and Engineering Fair of Houston

3023

SynaptiCare: Integrating Sleep Data and Tau Biomarkers to Assess Depression Severity

Medha Menon

Fort Bend ISD /Dulles High School

Category

Behavioral and Social
Sciences

Currently, depression treatment is a trial and error scenario such that if one drug does not work, another is tried till something "clicks." Not only is this medically ineffective, but it is also financially burdensome and prolongs the suffering of patients by delaying the identification of the most suitable treatment. This approach highlights the urgent need for personalized predictive tools that can guide treatment decisions more effectively. To address this, a treatment response prediction software was developed. Using biomarkers determined to have a strong correlation with depression; sleep and tau proteins, SynaptiCare was born. The study and analysis showed significant correlation between various sleep metrics and PHQ-9 scores, as well as between PET scans showing tau deposits, and depression. Analyzing these variables, SynaptiCare is able to predict the efficacy of drugs, allowing for targeted care for depression patients.

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- yes no



Abstract: Science and Engineering Fair of Houston

3024

Exploring the Psychological Impacts on Prisoners During Incarceration

Uvanuv Vishnu
Seven Lakes - HS

Category

**Behavioral and Social
Sciences**

The account focuses on the psychological impact long-term inmates feel from incarceration, emphasizing the level of prevalence of mental disorders and ascertainment of the effectiveness of mental health programs in prisons. The researcher used a mixed-methods design that included qualitative interviews and quantitative surveys to obtain inmates' mental health status and knowledge of their access to mental health services. The important finding indicates a high incidence of depression, anxiety, and PTSD among the incarcerated persons, with over 70% of participants reporting symptoms compatible with the disorders. The results also point to a shortage in provision of mental health services, as less than 40% of affected inmates were said to receive any regular psychological counseling or support. The study has concluded that long-term incarceration aggravates mental conditions, establishing the urgent need for reform in the complex area of prison mental health. The results favor the development of extensive mental health programs addressing the needs of long-term prisoners so as to reduce the potential negative effects of such incarceration on their rehabilitation. The abstract displays independently conducted research during one year, indicating the sole operations performed directly by members of the research team. There is an emphasis on the need to amend certain policies because of data collected from the study.

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Abstract: Science and Engineering Fair of Houston

3025

Silent Signals: Leveraging Linguistic Drift, NLP, and ML for Early Analysis of Depression Markers in Teenagers

Nikita Vijay

Nikita Pal

Nirajeet Pal

Cypress Ranch - HS

Category

Behavioral and Social
Sciences

CDC's Whole School, Whole Community, Whole Child (WSCC) Model emphasizes that mental health is crucial to students' well-being and performance, establishing schools as essential providers of emotional support systems. However, with national student-to-counselor ratios averaging 376:1 compared to the recommended 250:1, schools are critically under-resourced to meet the growing mental health needs of teenagers. Traditional methods often miss subtle emotional cues, leaving up to 60% of teenage depression cases undiagnosed (NIMH, 2023). Our research addresses this critical gap through Elev8Mind, a novel emotionally intelligent chatbot leveraging linguistic drift analysis, machine learning (ML), and the Clinical Emotion Mapping Algorithm (CEMA). Using non-identifiable usernames, not linked to student IDs, it tracks linguistic drift securely with full encryption, ensuring privacy. The study uses an ML model with Naive Bayes classification to assign "emotional indicators" to user inputs by analyzing tone, vocabulary, and structure. CEMA refines these indicators with PHQ-9 and BDI frameworks, ensuring clinical accuracy. Refined indicators and trends are stored in a linguistic drift database, enabling real-time tracking of emotional patterns. The ML component, trained and validated with synthetic and public datasets, achieves 91% accuracy ($p < 0.05$) in detecting emotional patterns. The refined emotional indicators inform the LLM (Mistral 7.0) to generate empathetic and clinically appropriate responses. An output counselor dashboard visualizes anonymized trends, including severity and linguistic drift by gender and grade, helping schools allocate resources effectively. Elev8Mind aligns with CDC's What Works in Schools program, providing a scalable solution to teenage mental health challenges. Future enhancements will integrate advanced models like BART, voice analysis, multi-language support, and expanded global implementation to address PTSD and anxiety

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Abstract: Science and Engineering Fair of Houston

3026

Category

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Abstract: Science and Engineering Fair of Houston

3027

A Gamified Go/No-Go Paradigm for the Epilepsy Monitoring Unit

Geoffrey Liu

Glenda Dawson - HS

Category

Behavioral and Social Sciences

The Go/No-Go (GNG) task is a well-known paradigm for studying response inhibition and impulse control. However, traditional GNG tasks often use repetitive presentations of letters or other visual stimuli, which can lead participants to lose focus and become disengaged, ultimately reducing performance over time. We developed a gamified GNG paradigm called the Anticipation Task (AT) to address this limitation. In AT, participants see computer-generated characters running toward them in a virtual environment. They must quickly decide to either close a gate (for "monsters", Go trials) or leave it open (for "humans", No-Go trials). The task features dynamic difficulty adjustments, varied character designs, and a point-based reward system, all of which help maintain interest and provide more naturalistic behavioral data. We recruited four patients with drug-resistant epilepsy and three healthy controls (ages 19 to 45) for a pilot study. Results showed that AT successfully captured key cognitive control behaviors, including faster reaction times for false alarms and slowing of responses with increasing difficulty. Preliminary single-unit activity data from two patients revealed distinct firing patterns in putative neurons. For example, one hippocampal unit showed increased activity during No-Go trials, while a unit in the orbitofrontal cortex was more active during Go trials. These findings demonstrate the potential for investigating neuronal activity during cognitive control using this novel task. Future work will focus on replicating these initial findings by analyzing data from a larger cohort of patients, incorporating new cognitive metrics (e.g., emotional regulation), and extending AT to pediatric populations.

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Abstract: Science and Engineering Fair of Houston

3028

Rainbow Fade

Bryan Aguilar
Stafford STEM Magnet Academy

Category

**Behavioral and Social
Sciences**

Lose the rainbow is an experiment used to figure out how the process of solubles leech into different liquids. The question of this experiment is to see what liquid dissolves a Skittles outer coating the fastest and whether stirring it would decrease the time. It was hypothesized that liquids with higher acidity levels and stirring the Skittles would dissolve the sugar coating the fastest. The independent variables are the liquids and the stirring condition. The dependent variables are the amount of time it takes a Skittle to lose its color outside. Controlled variables include the skittles used, volume of the liquids, and container used to hold the Skittles. For this experiment to be completed, you must add skittles to cups with different liquids and time how long it takes to dissolve them. Next, you will record the data and draw conclusions based on the times of different liquids and the stirred condition. Based on my results, I saw that the more acidic liquids like vinegar dissolved the Skittles the fastest in all the trials. I also noticed that stirring the Skittle allowed for a faster dissolving time in all the trials conducted. The hypothesis was correct, and the Skittle lost its color the fastest in vinegar while being stirred. This experiment helped see and explore the process of leeching with the help of Skittles.

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- yes no



Abstract: Science and Engineering Fair of Houston

3029

Human Perception VS AI Detection: Who identifies AI Writing Better?

Daimy Andrade

Arianna Solis

Conroe ISD /ASHP: Academy for Science and Health Prof

Category

Behavioral and Social
Sciences

The purpose of this investigation was to compare the performance of humans and AI in detecting AI-generated content. Our hypothesis was that humans would outperform AI in this task, as humans might be better equipped to recognize subtle cues in generated content. However, the results of the study contradicted this assumption. AI detectors demonstrated an overall accuracy of 65%, outperforming humans, who achieved only 55.5% accuracy. The experiment involved testing both humans and AI across various datasets, with AI performance showing notable improvement, particularly in Set 2, where AI reached an accuracy of 80%. While human accuracy remained consistent across tasks, AI showed significant variation across a range of datasets. These findings highlight the strengths of AI in content detection, especially in cases where human perception might be inconsistent. Despite AI's higher average accuracy, the variability in individual results raises questions about the reliability of AI detection systems in all scenarios. This experiment suggests that while AI can outperform humans in certain contexts, further investigation is needed to ensure its consistency and overall trustworthiness in content detection. Future research could explore ways to enhance AI's accuracy across diverse datasets and reduce variability in performance.

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Abstract: Science and Engineering Fair of Houston

3030

Ability of adolescents to differentiate between AI generated and human made images, text, and audio.

Izma Aziz

Clear Creek ISD /Clear Brook High School

Category

**Behavioral and Social
Sciences**

The purpose of this project is to investigate adolescents' ability to differentiate between AI-generated and human-made media across three formats: images, text, and audio. My hypothesis for this experiment was that if individuals aged 14-18 are presented with three types of AI generated media alongside human created media—images, speech, and text—then their accuracy in differentiating their origin will be higher with speech audio and lower with text and images. I hypothesized this because AI-generated audio often lacks natural components of human speech like pacing, emphasis on words, as well as emotional factors. To conduct this experiment, a survey was designed where participants were presented with three types of each media. They were asked whether or not they believed that the media was AI-generated, or human made. After these questions, they were asked how they decided to choose a certain answer choice. The results showed that the participants performed best at identifying audio samples, supporting the initial hypothesis. This study can have implications in the future because it can open pathways for further investigation such as examining how AI detection skills may differ across age groups or testing methods to enhance detection accuracy such as harder formats.

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Abstract: Science and Engineering Fair of Houston

3031

Effects of Sleep Deprivation on Academically-Proficient Adolescents

Huda Asif
Sevda Arslan
Harmony South District

Category

Behavioral and Social Sciences

Sleep deprivation is a rising concern amongst teens bearing the weight of having to consistently keep up with various rigorous courses. Rigorous courses common to highschool students across the nation—including pre-AP, AP, and dual enrollment—are often accompanied by intense hours of self-studying. Whether it's staying up to finish a last-minute assignment, or waking up a few hours early to get in some last-minute test prep, many adolescents are habitually losing vital hours of sleep. With the recommended amount of sleep per night being 8-10 hours for adolescents, apprehensions surrounding the impact of such deprivation have intensified. Considering this, we proposed the question of whether or not academically-proficient adolescents (defined as those enrolled in multiple AP, dual, or honors courses) who experience sleep deprivation (<6 hours of sleep per night) are more likely to display significant signs of cognitive-emotional impairment in respect to the severity of their sleep insufficiency? In order to test this theory, we set up an experiment in which the brain activity of two individuals of similar academic complexity and lifestyles was monitored using a smart headband. Trials of various amounts of sleep deprivation were simulated to compare the effects of a lack on sleep to their severity of health complications. Surveys were also conducted in order to test its impact on mood, accordingly. The results confirmed that an increase in sleep deprivation amongst teens leads to a decline in cognitive performance, commonly resulting in amplified mood swings, abnormalities in brain activity, and fluctuations in heart rate.

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Abstract: Science and Engineering Fair of Houston

3032

Impact of Music and Sound Frequencies on Brainwave Synchronization while performing a task in relation to Age

Zainab Ndiaye
Princess Abu
Emmanuella Ayedun
Harmony South District

Category

Behavioral and Social Sciences

The purpose of this project is to illustrate how sound frequencies affect the brain's function as we age, and what frequencies maximize our brain's productivity, attention, and comprehension. During the experiment, we place the human participant in a silent room. Our procedure begins with the human participant wearing the Muse EEG headband and headphones. The EEG headset records the brainwaves of the human participant and the headphones begin to play a specific frequency for a minute. During this minute, the human participant engages in a block blast puzzle, once the minute has concluded we stop and end the EEG recording session. We continue this experiment by playing another frequency that is a different hertz. After concluding our trials the results led us to conclude that frequencies that are higher in hertz such as 1250 hertz caused participants to become less calm, and less still, but participants were still able to perform the puzzle cognitively. Results showed that the alpha rays of participants stayed at an average of 9.5, which is not optimal but is still very satisfactory. In conclusion, this project led us to conclude that higher frequencies tend to cause distress in humans but don't affect the performance or task being performed.

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Abstract: Science and Engineering Fair of Houston

3033

Persona: A Novel Approach to Developing Interpretable and Efficient Conversational Depression Diagnosis Systems Based on Neurosymbolic Self-Supervised Machine Learning of Acoustic Modulations and Word Choice

Aniket Chakraborty

Source: ISD / AST: Academy of Science and Technology

Category

Behavioral and Social Sciences

As of 2017, depression has been the leading cause of disability among people aged 15 to 44 in the United States. Doctors currently rely on generic pre-screening written tests and diagnosis techniques from the Diagnostic and Statistical Manual of Mental Disorders, which fails to capture patients' unique emotions in the same way that conventional one-on-one sessions do. Attempts to create machine learning detectors for depression have not been adopted largely due to the lack of interpretability of their reasoning paths, leading to trust concerns. The goal of this project was to statistically model speech-based emotion based on acoustic modulations and word choice in a manner that would independently analyze individuals in an interpretable manner. A novel unsupervised clustering-based method was devised using principal coordinate analysis for dimensionality reduction to a 2-D space, using a metric known as the Wasserstein distance to quantify differences between spectral representations of speech acoustics. A technique called t-distributed stochastic neighbor embeddings was successfully used to autonomously group speech samples from the CREMA-D dataset into groups of similar emotional convictions. The cluster definitions were compared to an encoder-decoder-based regressive model that relied on generic classification of emotions based on Paul Ekman's theory of discrete emotions. Results suggested that the novel clustering model relying on continuous relativistic identification of emotions rivaled the encoder-decoder model in accuracy of emotion detection. Such statistical modeling reveals how existing theories of emotional representation are constrained by generalization, suggesting that humans perceive peer emotions in individual relativistic manners when provided limited context.

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Abstract: Science and Engineering Fair of Houston

3034

Gender Bias in Perceived Competency

Dhrumi Shah

Clear Creek ISD /Clear Lake High School

Category

**Behavioral and Social
Sciences**

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human participants

potentially hazardous biological agents

vertebrate animals

microorganisms

rDNA

tissue

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yes

no



Abstract: Science and Engineering Fair of Houston

3035

A Novel Approach to Microbiotic Dietary Programming for Optimal Mental Health

Cera Easterwood

Conroe ISD /AST: Academy of Science and Technology

Category

Behavioral and Social
Sciences

Mental health, an increasingly prominent field, significantly impacts all aspects of life. The project was motivated by a passion for more effectively enhancing the lives of those suffering from mental illness. After evaluating the current solutions including therapy options, medications, and peer-help groups, the researcher observed that these treatment options were not universally effective. In considering alternative solutions, the researcher prioritized identifying a factor that could be altered in any individual. Due to their adaptability, dietary alterations emerged as a promising area of study. Further background research revealed a term, gut-brain axis, which demonstrated that the bacteria in foods can alter hormone releases and create mood changes. The goal was to determine if an application for balancing a patient diet could effectively mitigate mental health conditions associated with the preliminary bacteria levels. An application was designed, and, from there, to preserve ethical guidelines, six simulations of different people were tested on. 120 sample diets were randomized through code to be tested in each simulation. The results highlighted that this project formed a viable medical treatment option as the number of detected mental health conditions was 68.437% lower after the application usage. After balancing diets through stored values, the simulated subjects reflected overall improvements with the majority of Anxiety, Depression, and Eating Disorder cases cured. The viability of this program could provide a cost effective, less subjective, long-term solution for those suffering with mental health challenges.

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Abstract: Science and Engineering Fair of Houston

3036

Neurofy: A Novel, Multimodal Machine Learning System for Low-Cost Dementia Detection and AI-Based Cognitive Support via Speech and Linguistic Analysis

Dylan Ma

Conroe ISD /AST: Academy of Science and Technology

Category

Behavioral and Social
Sciences

Everyday, more than 55 million people live with dementia, the seventh leading cause of death worldwide. Despite its widespread impact, presently, diagnosing dementia remains delayed, subjective, inaccessible, and socially stigmatized. Treatment options are also limited, blocked by high costs, inequity, and a lack of personalization. This study aimed to develop a new approach to the crisis, creating a multimodal system to both detect dementia early from several potential acoustic and linguistic biomarkers and provide real-time cognitive support, mitigating symptoms and slowing disease progression. Built upon hundreds of publicly available spontaneous audio files scraped digitally, ten robust classification and hybrid models were tested, with a Long Short-Term Memory Model achieving 93.8% accuracy at predicting dementia based on acoustic features and a Support Vector Machine reaching 95.1% at the same task utilizing linguistic attributes. Furthermore, in-depth feature analysis was conducted, validating speech rate, jitters, repetition, and reduced thematic coherence as viable biomarkers for dementia. For long-term aid, a GPT-based model proved optimal, seamlessly integrating cognitive therapy, stimulation, and support. The finalized models were implemented into Neurofy, a free, innovative, and easily-accessible platform for accurate dementia diagnosis and personalized, on-the-go treatment, enabling users to detect cognitive decline early and slow its development, greatly increasing quality of life and allowing for extended monitoring and support. Neurofy is a promising solution to the ever-growing issue of dementia, potentially setting the standard for the future of cognitive psychological diagnosis and treatment, addressing the needs of millions today and millions more tomorrow.

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Abstract: Science and Engineering Fair of Houston

3037

Elderly Loneliness - The Effect of Peer Companionship on the Levels of Loneliness of People Ages 60 and Older

Tvisha Singh

Sophia Rice

Conroe ISD /AST: Academy of Science and Technology

Category

Behavioral and Social
Sciences

Elderly loneliness is a widespread and important issue in today's society, especially after the Baby Boom and Covid-19. It is linked to detrimental physical and mental health outcomes, including depression, cognitive decline, and increased risk of chronic diseases. Our study investigates how elderly peer companionship affects loneliness among people over 60 years of age. Our participants included a total of 528 elderly individuals from two nursing homes and a memory care facility, with equal representation of genders and age groups. Participants were paired based on age, gender, and shared interests to engage in 10 peer companionship sessions over seven weeks. Each session lasted one hour and included prompts to facilitate interactions. Loneliness levels were assessed through pre- and post-session surveys, which also documented additional factors such as social media use, physical activity, and family interactions. Our results revealed a significant reduction in loneliness levels among participants engaging in companionship compared to the control group which was not engaging in companionship. Female participants and individuals aged 60-69 experienced the greatest improvement. Factors such as frequent family contact, social media use, and physical activity further reduced loneliness levels. These findings showed that companionship programs are a viable alternative to cognitive behavioral therapy to combat elderly loneliness. Companionship sessions are also cheaper, more accessible, and place less of a strain on healthcare professionals. The next step is to implement our study in more nursing homes to aid the elderly and to bring more awareness to the problem of elderly loneliness.

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Abstract: Science and Engineering Fair of Houston

3038

Investigating Circadian Rhythm Disruption and Sleep Optimization

Rafael Zhang

Luca Giannetti

Clear Creek ISD /Clear Lake High School

Category

**Behavioral and Social
Sciences**

Despite growing awareness of the negative consequences associated with circadian misalignment/disruption, there is still a need for more targeted research to understand how specific sleep conditions interact to influence performance and wellbeing. Therefore, this study aims to investigate these variables through a controlled participant data collection approach, allowing the development of deeper insights in sleep optimization. We believe that if circadian rhythm disruption increases, then cognitive performance, processing response times, physiological health, emotional/mood regulation, and sleepiness/fatigue metrics will worsen. To identify patterns between chronotypes and specific sleep environments with performance indicators, sleep conditions were systematically assigned to 2 participant groups of 12 over 4 experimental phases while collecting daily data on performance in various professional assessments/questionnaires. Each phase (Screen Usage, Light Exposure, Meditation/Relaxation Practices, Chronotype Misalignment Simulation) tested 3 levels of 1 independent variable, with all other independent variables kept at their control levels. Data analysis indicated that participants with a morning chronotype consistently achieved the highest Proficiency Index scores and the lowest Insufficiency Index scores, with evening chronotypes performing the worst overall. Performance declined across increasing levels of the independent variables in Phases I, II, and IV, supporting that greater circadian disruption has a negative impact on the performance metrics investigated. In Phase III, performance improved progressively, suggesting that certain practices mitigated these effects. This result suggests that aligning sleep conditions and environmental factors with individual chronotypes can optimize performance and well-being while reducing the harmful effects of circadian disruption.

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Abstract: Science and Engineering Fair of Houston

3039

Identifying Changes in Cognition in Correlation to Short-Term LLM Usage

Raya Patel

Fort Bend ISD /Ridge Point High School

Category

Behavioral and Social
Sciences

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Abstract: Science and Engineering Fair of Houston

3040

The Effects of Short Form Videos on Episodic, Semantic, and Working Memory

Isabella Wong

Benjamin Zhou

Conroe ISD /AST: Academy of Science and Technology

Category

**Behavioral and Social
Sciences**

This project examined how short form videos affect Episodic, Semantic, and Working Memory in humans. Short form videos have become increasingly popular, and the goal of this project was to see if scrolling on short form videos would affect one of the most important cognitive functions of humans: memory. Three types of memory were tested: Episodic Long Term Memory, Semantic Long Term Memory, and Working Memory. There were 56 participants, aged 12-18 years old, tested using the Category Fluency Test for Semantic Memory, the Digit Span Test for Working Memory, and the Word Recall Test for Episodic Memory. The data was analyzed using pie charts, line graphs, linear regression, Pearson's correlation coefficient, and means. From the line graphs, it seemed that Semantic Memory was most negatively impacted. The given line for linear regression for all three memories had a negative slope with correlation coefficients of around $-.94$, $-.65$, $-.95$ for Semantic, Working, and Episodic Memory respectively. These statistics can support that watching more short form videos can affect some types of memory needed to comprehend material in classes. Overall, the hypothesis was rejected as not all three types of memory were negatively affected the same way. However, this research still has a lot of potential as it was observed Semantic and Episodic Memory were quite affected by short form videos. This study could also initiate more research to be done on how short form videos affect other cognitive functions, such as sleeping habits, procrastination, and other cognitive functions.

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- yes no

4. This project is a continuation of previous research.

- yes no

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Abstract: Science and Engineering Fair of Houston

3041

Sweat on the beat: Assessment of exercise capacity while singing and walking using noninvasive technique

Sarvesh Sankar Dass

Dhruv Saitwal

Abhinav Nambi

Fort Bend ISD /Elkins High School

Category

Behavioral and Social
Sciences

Background Singing while exercising may increase the intensity of the exercise and be associated with fitness levels. Our pilot study aims to determine whether fitness measured using non-invasive monitoring of sweat-lactate levels (instead of traditional methods which require wearing a mask, which is cumbersome) will vary while singing songs and running at varying speeds. Procedures We obtained blood pressure, oxygen saturation, and BMI from three middle-aged participants. Participants ran on a treadmill while wearing a non-invasive OnaSport band which measured sweat lactate, walking at speeds of 3, 3.5, 4, 4.5, and 5 miles per hour. Participants walked on three separate occasions, 1) without singing 2) while singing a (slow) 81-bpm song and 3) singing a (fast) 177-bpm song. We recorded the sweat lactate levels, heart rate and subjective measure of exhaustion. Results The sweat lactate levels did not differ between the baseline and the fast song but did show a higher lactate levels while singing the slow song. The heart rate response during the baseline walk was similar to when the participants sang the slow and fast songs. This contrasted with the subjective assessment of exhaustion from participants, who reported more exhaustion with the fast song. An increase in lactate levels showed more energy exerted with the slower song than they did with the faster song. Conclusion Although there was more subjective exhaustion while singing, sweat lactate and heart rate did not differ. In future studies, we will study the correlation between singing, sweat lactate levels, heart rate and physical fitness.

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Abstract: Science and Engineering Fair of Houston

3042

How Age Influences Recognition of Facial Emotions

Divya Kirumakki

Madalyn Pruitt

Clear Creek ISD /Clear Springs High School

Category

**Behavioral and Social
Sciences**

This project researches the correlation between age and the ability to recognize emotions through facial expressions. The study divided participants into 7 age groups: 10-14, 15-19, 20s, 30s, 40s, 50s, and 60+. Participants were presented with a series of facial images expressing basic emotions and 4 possible answer choices that remained the same for each question. The survey was conducted using a Microsoft Form and shared with people all over the United States. After analyzing their results, it was revealed that participants in their 30s were the most accurate, though not by a huge margin. This suggests that this age group has greater emotional intelligence. On the other ends of the spectrum, people of older (60+) or younger age (10-14) had the lowest accuracy. This is indicative of the disparity between either age group in terms of cognitive development. At an older age, the brain begins to deteriorate and at a younger age, the brain is not yet fully matured. This can help us understand each demographic's talents and utilize them in society accordingly. Especially considering human interaction is more than a necessity – it's part of who we are as a social species.

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Abstract: Science and Engineering Fair of Houston

3043

Sweet Dreams: The Impact of Napping on Highschool Teens

Hannah Perego

Gabriela Garay

Conroe ISD /ASHP: Academy for Science and Health Prof

Category

Behavioral and Social
Sciences

This study investigates the impact of sleep on cognitive memory and performance. Sleep plays a critical role in brain function, influencing learning, and overall cognitive abilities. Ten participants were asked to complete an online cognitive memory test that assessed short-term memory, attention span, and recall. After the initial test, participants were given a 45-minute nap break. Upon waking, the participants then retok the same cognitive memory test. The results were analyzed to compare performance before and after the nap. The findings indicated a significant improvement in memory recall, reaction time, and overall performance after the nap, suggesting that short naps can enhance cognitive function. These results support the hypothesis that midday naps help improve the processing speed and attention span of high school students. This study highlights the potential benefits of naps for boosting cognitive memory and providing insights into the relationship between rest and brain performance.

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Abstract: Science and Engineering Fair of Houston

3044

The Effect of Time Constraints on Ethical Decision Making

Rima Shah

Clear Creek ISD /Clear Brook High School

Category

**Behavioral and Social
Sciences**

The topic of this project was to see if time constraints influenced ethical decision outcomes. The hypothesis was that if a participant had less time to decide, they would be more likely to make a decision that was against their morals or the wrong choice. I believed this would be the correct outcome because I tend to make unjustified decisions due to the time I am given. To conduct this experiment, I simply gathered 20 participants and tested them with three questions with five different time constraints for each question. I then asked the participant to reflect on their choices with a survey. After analyzing the data, I concluded that time constraints did affect the decision-making process of most participants and that the hypothesis was correct. During the early time constraints of questions one and three, there were small fluctuations in the rate of confidence. For the time intervals two and three during those questions, there was a decrease in confidence when the time increased. The results from this project can be used in modern society by providing justification as to why people tend to make decisions, they know are wrong.

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Abstract: Science and Engineering Fair of Houston

3045
FLOW

Asim Abidi
Stafford STEM Magnet Academy

Category

**Behavioral and Social
Sciences**

Speech synthesis software, a ubiquitous part of modern society, often sounds artificial due to irregularities in rhythm and structure. One key factor that can contribute to this is pause length. The FLOW project aimed to identify repeatable patterns in rehearsed speech to produce defined equations for predicting pause length. We hypothesized that time since last breath, average recitation speed, punctuation type, and word make-up would all play significant roles in the length of a pause in rehearsed speech. To test this, a form created on Jotform® collected user voice recordings of a professional article and a short elementary story. These recordings were analyzed using DaVinci Resolve to collect different variables. The results showed a clear correlation between average recitation speed, pause length, and sentence length. While the findings support the hypothesis, the complexity of the problem suggests that further analysis could yield more accurate equations that produce better artificial speech.

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Abstract: Science and Engineering Fair of Houston

3046

The Math Behind Emotions: Isolating Specific Sounds That Evoke Human Emotions

Daniel Levin

Friendswood ISD /Friendswood High School

Category

Behavioral and Social
Sciences

Music is a universal language with a powerful ability to evoke human emotions. This phenomenon has fascinated humanity for centuries, sparking elaborate symphonies that attempt to tap into this ability. However, despite its seemingly artistic nature, music is fundamentally grounded in mathematics, with every note and chord capable of being represented as a collection of sine waves. This project explores whether sound properties, such as frequency, amplitude, and duration, can be mathematically isolated to predictably evoke specific emotions. Spectrograms were used to visualize a variety of music tracks, and Fourier transformations were used to deconstruct the tracks into their sine wave components. Part of the project involved analyzing various musical pieces from different genres and trying to alter them using music-editing software (i.e. Audacity) to change the emotions caused by the music. The original and edited tracks were then sent out in a 2-week survey to receive feedback on how, or if, emotional responses were different between the tracks. The results seem to indicate that there is a correlation between sound characteristics and the emotions they elicit. Future research could be conducted to expand the range of sounds studied and to verify findings through additional surveys. This data could be useful in applications such as designing therapeutic soundscapes to improve the quality of music therapy or healthcare environments. Through building a deeper understanding of music's emotional influence, this research lays the groundwork for innovative tools that can harness sounds to improve human well-being.

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Abstract: Science and Engineering Fair of Houston

3047

Pun Involving Worms

Dashiell Allen-Smith
Pasadena Memorial High School

Category

**Behavioral and Social
Sciences**

Many people listen to music, especially those with developing minds. This study uses the invertebrate *C. Elegans*, known for its use in the medical field, to study the reactions to various genres of music. The *C. Elegans* are exposed to silence, white noise, and 10 different genres of music in 5 minute intervals, where their behavior is recorded relative to the speaker that is playing the audio by measuring the distance of the majority from the speaker.

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Abstract: Science and Engineering Fair of Houston

3048

AutoScan: Development of a Predictive Computational Model for Assessing Probabilities of Neurobehavioral Symptoms of Autism Spectrum Disorders Based on MRI-Derived Structural Metrics, with a Focus on Cerebellum Volume and Phenotypic Correlations in ASD

Category

Behavioral and Social Sciences

In the US, scheduling an appointment for autism with a specialist can take months due to the limited availability of doctors. Now, imagine the challenges in developing countries, where barriers like limited healthcare access, financial constraints, and lower levels of education make diagnoses and treatment even more difficult. These barriers prevent millions of individuals from receiving the care they need, especially for conditions like autism spectrum disorder, where early diagnosis is critical. Thus, this research uses structural MRI data to explore a novel, AI-powered diagnostic tool designed to assess ASD-related phenotypic characteristics with high accuracy. By analyzing brain volume variations and their correlation with key behavioral and cognitive traits, this study offers a groundbreaking, non-invasive approach to autism diagnosis. 403 participants were administered brain magnetic resonance imaging and several assessments that revealed key phenotypic data. FSL was used to skull-strip, segment, and calculate brain volume. Correlations between cerebellum volumes and key phenotypic characteristics related to autism - such as repetitive, restricted, stereotyped, and compulsive behaviors - were analyzed and ran by Linear Regression T-tests for statistical significance ($p < 0.05$). The dataset was divided into training and testing sets, typically with 80% for training and 20% for testing. Using Scikit-learn from Python, the AI learned to identify patterns in the training data by minimizing the error between predicted and actual phenotypic values using optimization techniques. AutoScan assesses the phenotypic variable outcomes with an average accuracy of 90%. By significantly reducing diagnostic complexity and time, AutoScan represents the future of mental healthcare access.

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