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Indiana University - Purdue University Fort Wayne

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PROCEEDINGS

Student Research and Creative Endeavor Symposium

April 9, 2005

Science Building 185 & 168

Indiana University-Purdue University Fort Wayne
April 9, 2005

Welcome to the eighth annual IPFW Student Research and Creative Endeavor Symposium. It is with great pride that the Office of Research and External Support sponsors this Symposium. Active learning through research is an extremely valuable part of the student experience at IPFW.

This year’s symposium represents an exciting change for IPFW. For the first time, the symposium is being held outside of traditional class time and, for the first time, prizes will be offered to the best undergraduate student presentations in three content areas.

Additionally, I invite all IPFW undergraduate students to submit an application for the Pulin Sampat Memorial Undergraduate Research Award. This award, given annually to an outstanding undergraduate researcher, honors the memory of former IPFW student Pulin Sampat.

Finally, I offer a special thank you to the numerous faculty sponsors who have guided the research being presented today. Because they understand that learning is best achieved through active participation in research in the discipline, the experiences they provide are essential to the core mission of the University.

Best wishes,

Carl N. Drummond
Associate Vice Chancellor for Research and External Support
Gender Differences in Directional Decisions: Role of Mental Rotation
Crystal D. Akers
Carol A. Lawton
Psychology
Indiana University-Purdue University Fort Wayne

Previous research has shown that males prefer to use north, south, east, and west as reference points during navigation, whereas females prefer to use landmarks. Previous research has also shown that males are better at certain spatial tasks, such as mental rotation. The current study looked at whether there might be a relationship between navigational behavior and mental rotation ability. We measured gender differences in performance on tasks involving directional decisions and mental rotation. Participants were 338 college students (109 males; 229 females) ages 18-58. Participants were asked to envision that they were heading in a particular direction (north, south, east, or west). In the north-up condition, there were 64 trials in which “north” appeared at the top of a computer screen, and a drawing of a head faced either the top, bottom, right, or left side of the screen, representing the direction of travel. In the head-up condition, there were 64 trials in which the head always faced the top of the screen, and there was also a label at the top of the screen (“north,” “south,” “east,” or “west”) that showed the direction of travel. In both conditions, participants were asked to indicate whether the head should turn right or left to face a different specified direction (e.g., if head faces west, turn which way to face south?). Males were quicker and more accurate at choosing the correct way to turn in both the north-up and head-up conditions. Males were also significantly more accurate on a separate test measuring mental rotation ability. Mental rotation ability was correlated with accuracy on the directions task. These findings suggest mental rotation ability may be related to men’s greater tendency to use north, south, east, and west as reference points during navigation.
Seigniorage and inflation: Argentina 1982-1984
Jim Atz
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

A nation’s central government, along with its central bank, has monopoly control over the creation of the money supply. The revenue a government earns by printing money is called seigniorage, and the inflation that is may occur due to the increased money supply is called inflation tax. Seigniorage, once relied on too heavily to finance the government deficit, can easily lead to hyperinflation. The purpose of this paper is to examine how seigniorage in the economy of Argentina economy between the period of 1982 and 1984 reached unsustainable levels, eventually leading the country on the path to hyperinflation. The stability of a currency, which is undermined by rapid inflation, is a vital element to any civilized society. Weakening of a country’s currency threatens to overturn the basic foundation of any society. The severity of such an occurrence legitimizes the study of currency as of the utmost importance. By utilizing the quantity theory of money, it is possible to analyze what effects growth of the money supply that far exceed the growth of the economy’s real output will have on the value of a government’s currency. The government of Argentina incurred large budget deficits as a result of increases in government spending. The government’s policy to increase revenue was that of seigniorage. This paper will prove that the Argentine government’s monetary policy, which consisted of large increases in the money supply, was the direct cause of the hyperinflation that the country and its people faced during the years of 1982 and 1984.
Mt. Vesuvius: Dead or Dormant?
Krista Auld
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

In August 79 A.D. one of the world’s deadliest volcanoes erupted turning the once thriving Pompeii, Italy into a garden of statues representing the death and destruction that occurred. What would happen if this volcano were to erupt again as volcanologists are predicting to happen by 2100? What effects would this have on Italy with Naples, one of its major cities, located in the “red zone”? To best predict what effects will be present as a result of another explosion, applicable models will aid in the economic analysis. I predict that once the volcano explodes Italy will fall from a promising economy to that comparable of a third world country.
The Move: Concordia Lutheran School’s Relocation

Robert C. Boyd
Kathleen Murphey
Education
Indiana University-Purdue University Fort Wayne

Beginning in 1899, Concordia Lutheran School served as a ministry of Concordia Lutheran Church on Fort Wayne’s near east side for over fifty years. As the 1950’s rolled on, a number of factors convinced the leaders of the church that the school could no longer effectively function in its current facilities and location. After extensive research, a decision was made to move the school and eventually the church to a more suburban location.

From the outside, the move might look like just one more example of the white flight that so impacted inner-city neighborhoods in the 50’s and 60’s. However, the internal decision-making process at Concordia was far more complex than might have been imagined. Add to that the impact of cultural changes within the city of Fort Wayne, especially on the east side. Determining the real driving forces behind the move makes for intriguing research.

Through first person interviews, letters, meeting minutes and other historical records of the church and through scholarly resources, a more detailed and nuanced understanding can be gained of Concordia’s decision to move its school ministry. In the process, a missing, or perhaps just misunderstood, piece of Fort Wayne’s history is discovered.
Researchers into the Harappan Civilization fall into two camps when considering the purpose and use of the Harappan stamp seal. The majority see the seals as cognate to Near Eastern seals in terms of use and purpose. The other questions whether the small square generally stone artifacts are seals at all and if they are how were they utilized. They call attention to the fact that the seals are almost exclusively manufactured from steatite, an extremely soft stone. They do not see how seals of steatite would survive in the observed nearly unworn condition if utilized in the amount proposed by the majority. In summer 2004, an experiment was carried-out to determine the durability of Harappan Stamp seals. A seal of average proportion was manufactured and stamped into clay balls to replicate proposed use, the seal was recorded throughout. This paper presents the results of this research.
Macroeconomic Effects of Diminishing Social Security Funds
Amy Buzzard
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

The president insists that by 2018, social security payouts to retirees will begin to exceed the amount of money that comes in from payroll taxes and, from there on, benefits will be endangered. This crisis will affect the whole economy by raising taxes each year, cutting benefits, or increasing government borrowing. Each of these scenarios will be examined using the Classical Model to understand their full macroeconomic effects. Suggestions will then be made based upon these results to help more clearly define the upcoming crisis in the Social Security system.
The purpose of this study was to examine the relationship between hypnotizability and dental anxiety, and if hypnosis can attenuate that relationship. Participants ($n = 291$) were administered a group measure of hypnotizability, (the Harvard Group Scale of Hypnotic Susceptibility), the State-Trait Anxiety Inventory and a demographics questionnaire. Participants were randomly assigned to either a hypnosis or no hypnosis condition and a sound or no sound condition. Participants in the hypnosis group were administered a brief hypnosis technique. Participants in the no-hypnosis group were told to take a ten minute break and walk around. Participants then viewed a brief video of a dental procedure, either with the sound of the drill or no sound, and then completed a dental anxiety questionnaire and a dental history questionnaire. Results indicated a significant positive relationship between trait anxiety and dental anxiety and between numbers of dental procedures experienced in the past and dental anxiety. There were no between-group differences for either the hypnosis or sound conditions. Results suggest that persons who are predisposed to anxiety as a character trait may be more sensitive to the effects of experience with dental procedures, and that persons who are experiencing transient situational anxiety may not be as easily affected by going to the dentist.
China’s Interest and Influences on American T-Bills
Billy Foreman
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

This Paper will include information on why China has such an obsession with buying up American greenbacks. Also, the paper will examine how this has affected the value of the dollar and how it affects the Feds decisions on interest rates. The paper will show how much money China has poured into the economy and correlation it may have with American T-Bills, preferably the 10 yr T-note which determines long term interest rates.
Outsourcing White-Collar Jobs
Brett Frauhiger
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

Where is the future of America going? This paper is taking a look at the current job situation and the implications that it has on the future. A few years back our government passed the North American Free Trade Agreement (NAFTA). Under NAFTA America shipped a great deal of blue collar jobs across our boarders so American workers can better concentrate on technical/business or white collar jobs. Years later our white collar jobs are starting to be outsourced. This leaves America with a bleak economy based on fast-food and Jennifer Lopez. This paper will examine NAFTA's on the real wage, the current state of our white-collar jobs. This analysis will also examine America's future if we can only rely on Fast-Food, Music, and Movies for our GDP.
**Investment in Education: Male vs. Female**

Brett Frauhiger, Martha May, Robert Potter
Hedayeh Samavati
Economics
Indiana University-Purdue University Fort Wayne

This paper is an attempt to compare the investment of human capital for both men and women. The paper examines gender differences in human capital investment in two distinct ways. First, we study the acquisition of human capital as an individual decision. Second, we investigate employer’s decisions regarding provision of educational opportunity for male and female employees. In our investigation we inspect patterns and trends in educational endeavors. In addition, we look for differences that may result from class and racial differences for both men and women.

Level of education is a major determinant of an individual’s economic fortunes in general, and wages and salaries, in particular. Therefore, the findings or our investigations will help to better understand the gender wage-gap that exists in the United States. A better understanding of the relation between human capital and earnings will help both men and women make informed decisions about their investment in education. Policy makers and employers who are interested in promoting a more equitable and prosperous economic environment will also benefit from our findings regarding provision of educational opportunities for both sexes.
Pollutants and the potential for stress on resident fish
Christina Funk
Robert Gillespie and Ahmed Mustafa
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Indiana University-Purdue University Fort Wayne

The goal of this research study was to see if exposure to agrichemicals caused adverse effects on the resident fish populations in two tributary drainage ditches to Cedar Creek. Because it drains a much greater area of agricultural land, we hypothesized that fish from the Matson Ditch would show greater stress effects from runoff contaminants than those from Swarz Ditch. Blacknose dace and creek chubs were collected from the Matson Ditch (County Road 39) and the Swarz Ditch (County Road 37) during summer, 2004. Blood and kidney tissues were dissected and analyzed for hematocrit and phagocytic activity, respectively. For hematocrit analysis, blood was taken from the fish on-site and kept in a cooler until it could be centrifuged at the laboratory. After centrifugation, the hematocrit tubes were analyzed to determine the percent packed cell volume. For phagocytic activity, cells were viewed under a microscope and the percent of inactive macrophage (cells that had engulfed less than 5 bacteria) was quantified. A one-way ANOVA and Tukey’s test was used to determine significant differences between sites. The percent of inactive macrophages for blacknose dace did not differ between sites (48%-52%). However, the percent of inactive macrophages in creek chubs from Matson Ditch (73%) was greater than that in chubs from Swarz Ditch (61%). Hematocrit of blacknose dace (36%) and creek chubs (46%) from the Matson Ditch was significantly greater than that of dace (25%) and chubs (35%) from Swarz Ditch. We would expect less macrophage activity and greater hematocrit in fish exhibiting a stress response. Therefore, the results of this study suggest a possible stress-induced effect in fish exposed to contaminants from agricultural runoff. However, the significance of reduced phagocyte activity and increased red blood cell production to the health and survival of fish exposed to runoff contaminants needs further study.
Democracy and Theocracy: a Tibetan case study
Jeremy Ganshorn
Alan Sandstrom
Anthropology
Indiana University-Purdue University Fort Wayne

In this presentation I will look at the effect that conceptions of deity have had on the transition of Tibet from a theocracy to a democracy. His Holiness the Dalai Lama the 14th incarnation of the Chenresig Buddha had to flee to India to escape Chinese pressure in 1959. Since occupation of Tibet itself the exiled government in India has worked to bring the benefits of democracy to the Tibetans. The spiritual and temporal leader of the country is the Dalai Lama based upon the Buddhist tradition. There is potential contradiction when trying to describe the Tibetan political organization as a democracy while the country is led by a reincarnated deity. I will use neoinstitutionalism to help explain the new political discourse in the Tibetan exile community reconciling democracy with rule by reincarnate.
Characterizing a long wavelength fluoroionophoric probe for sodium and potassium ions
Derek L. Garcia
Michael R. Columbia
Chemistry
Indiana University-Purdue University Fort Wayne

Fluoroionophores are compounds which possess the ability to both fluoresce and bind ions; when the fluorescence of the compound is altered by binding specific ions, it can be used as a probe to measure the concentration of those ions in a solution. In 1998, Akkaya and coworkers reported the synthesis of such a compound incorporating a squarine-based fluorophore and two ionophoric aza crown ethers.

![Chemical structure of the probe](image)

We have reproduced this synthesis and have characterized fluorescence intensity and lifetime of the product in various nonaqueous solvents and in the presence of varying concentrations of sodium ions and potassium ions. These results are used to assess this compound as a probe for sodium ions and potassium ions.
Examination of Affirmative Action as a Social Policy
Emily Geimer and Brent Satterley
Hedayeh Samavati
Economics
Indiana University-Purdue University Fort Wayne

The purpose of this paper is to study Affirmative Action in terms of its intent and its impact, economically as well as socially. Specifically, we will discuss the positive and negative impacts of Affirmative Action as well as the controversy surrounding the issue. Furthermore, we will investigate how the enactment of Affirmative Action has evolved over the years and how this act has impacted society. We examine whether the intended consequences of this act have been carried out in terms of improving equality and providing equal opportunities for different races as well as different sexes. Findings of this study will be helpful to policy makers who are interested in creating an equitable economic and social atmosphere in this country.
The Unemployment Rate of Spain
Allan George
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

Why is the unemployment rate in Spain one of the highest in the world? Does the high price of unemployment insurance and benefit compensation play a major role in the unemployment rate? With Spain paying such high unemployment compensation there is less incentive for the unemployed to find jobs and therefore the unemployment rate is less likely to decline. A model which identifies the job separation rate \( (s) \) and the job finding rate \( (f) \) as key components of the natural rate of unemployment will be used to consider this important issue. The Bank of Spain will serve as the primary data source. It is anticipated that the government's fiscal policies with regard to the earnings of the unemployed have a direct effect on why the unemployment rate is so high.
This presentation focuses on the use of smokeless tobacco. Ingredients, addiction, oral effects, advertising, prevalence, true stories of users, smokeless tobacco in comparison with the use of cigarettes, and helpful tips to quit are addressed. Included are the proper oral homecare methods. Today's tobacco companies target young male adolescents with aggressive advertising. They do this to replace those who have died from the use of their product. The manufacturers of smokeless tobacco want these individuals to become addicted so that they will continually buy their product. These companies' advertisements depict a lifestyle that will intrigue possible users. What these advertisements do not show is the truth about their product. There are many implications to using smokeless tobacco. The oral effects alone are tremendous and include: oral cancer, kerotic pouch, abrasion, gingivitis, periodontal disease, recession, tooth decay, black hairy tongue, stained teeth, loss of taste, and bad breath. The use of tobacco products has significant affects on an individual's oral health. Since the mouth is the gateway to the rest of the body, overall health is affected when the mouth is not healthy. This presentation is targeted to young male adolescents who need to be informed that the lifestyle portrayed in advertisements is not a reality. Ultimately, the goal of the presentation is to save lives.
Gender Differences in Image Integration and Mental Rotation
Jennifer K. Green
Carol A. Lawton
Psychology
Indiana University-Purdue University Fort Wayne

We examined gender differences in the ability to integrate two images after they had been briefly flashed on a computer screen. Participants were 274 undergraduate students (194 female, 80 male). On each trial two 4x4 grids were flashed in sequence. The first grid contained dots in seven locations and the second contained dots in eight locations not used in the first grid. If the two grids were combined, there would be one empty location. Participants were asked to identify the one empty location. The grids were either presented back to back with a 0 ms interval, 500 ms interval, or 2000 ms interval. After being presented with the two grids, participants were shown an empty grid and were asked to indicate the location in which no dot had been previously filled by either of the two grids. Males were significantly more successful than females in determining the correct location of the missing dot. In addition, participants were tested on a mental rotation task in which they were shown a three-dimensional drawing of blocks and asked to choose the two drawings that represented the original arrangement of blocks rotated at different angles. Males were significantly better than females on the mental rotation task, and performance on mental rotation was correlated with image integration performance. The results indicate that gender differences on spatial tasks, such as mental rotation, may be related to the ability to mentally integrate images.
The German Unemployment Problem
Dennis Gregg
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

The purpose of this project is to take an in-depth look at the economic factors behind 'unemployment puzzle' which has been plaguing Germany for the last thirty years. The reason to study this problem is quite simple. One of the major problems faced in economics is the limited application of control experiments. Since employment is one of the strongest keys to economic success, the importance of studying any unemployment phenomena occurring in other countries becomes clear. The project will reach a conclusion on the factors behind the German unemployment puzzle by analyzing unemployment trends in Germany's recent history in relation to major economic developments.
Monetary Policy Using Macroeconomic Variables
Andrew Harrington
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

The Federal Reserve has one of the most important tasks in the United States. How does the Federal Reserve use macroeconomic variables in determining the appropriate Fed Funds Rate? By using trend analysis, this study will examine which macroeconomic variables are important to the Federal Reserve board’s interest rate decision making process. Graphs will be used to show how macroeconomic variables and the Federal Funds Rate fluctuate with one another. The ten variables that will be examined will be: GDP, Consumer Spending, Inflation, Trade Deficit/Surplus, Government Spending, Unemployment, Value of the Dollar, Consumer Sentiment, Oil Prices, and Productivity. The information will come from many sources and websites including: www.federalreserve.gov, www.census.gov, www.stat-usa.gov. Data from each district branch of the Federal Reserve will also be utilized. The findings will help identify which economic indicators are important in the determination of the Federal Funds Rate.
Causes of German Hyperinflation After WW I
Jordan Heller
Carolyn Stump
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Indiana University-Purdue University Fort Wayne

Hyperinflation is and will always be a serious problem to any economy that it affects. Hyperinflation is defined as a rapid increase in the price level of the goods and services of an economy. One of the most severe hyperinflations dates back to the early 1920's in Germany after World War I. The causes of this period of hyperinflation will be examined through the use of graphical analysis (trend data), macroeconomic theory, and the use of the quantity theory of money equation. This data will be found through internet sources, Dr. Mankiw's *Macroeconomic Theory*, and articles. The use of this data and analysis will help solve what happened to Germany after World War I, to cause this hyperinflation.
A Typology and Comparison of Triangular Projectile Points from Central Indiana
Scott Hipskinld
Robert McCollough
Anthropology Department
Indiana University–Purdue University Fort Wayne

This study looks at Triangular projectile points from four different Late Prehistoric sites in central Indiana. Using Railey’s (1992) typology system, the triangular points from Heaton Farm site in Greene County, Clampitt site in Lawrence County, and Castor Farm and Strawtown enclosure sites in Hamilton County were categorized and compared. The basal widths of the points from Heaton Farm, Castor Farm and Strawtown enclosure were also compared with the results of the Bradbury and Richmond 2004 study. This study gives a comprehensive look at how triangular projectile points from Late Prehistoric sites in central Indiana change spatially and temporally.
Chromatographic separation of anions using inverse photometric detection
Samuel R. Hochstetler
Michael R. Columbia
Chemistry
Indiana University-Purdue University Fort Wayne

Separation of common anions like chloride, bromide and nitrate is achieved using ion exchange chromatography. Detection of these ions as they exit the ion exchange column is frequently based on changes in the conductivity of the outflowing stream. This requires a dedicated conductivity detector and a second column to suppress the native conductance of the mobile phase. Due to the cost of these items we have attempted to achieve similar separations using an existing detector which measures the absorbance of light. To detect light-transparent ions like chloride, a light-absorbing species is added to the mobile phase. When the transparent ions exit the column, the light-absorbing species is diluted and the absorbance of light decreases. Such a detection scheme is called inverse photometric detection. We report results using various light-absorbing species (e.g., benzoate, salicylate, hydroxybenzoate, phthalate, etc.) and their effectiveness in separating chloride, bromide and nitrate on an unmodified high performance liquid chromatograph.
Recovery from Recession
Todd Hockemeyer
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

Economic indicators such as GDP and Unemployment rate are under constant observation. Looking back through the years, these indicators can help explain the outlook to the future. A correlation coefficient can be used to explain how each indicator may move with one another. The results from this coefficient may help indicate a movement in response to one another. Using the recent recession events in economics from the year 2000 to 2004 and comparing past historical economic events from the year 1990 to 1994, a comparison or contrast may occur. The result from past events can be used to show a consistent pattern within the economic indicators. Certain events in history can be used to prepare for the coming years.
The Deceptive Gender Divide in Math and Sciences
Scott Hofrichter, Charles Grawcock, Anglaique Smith
Hedayeh Samavati
Economics
Indiana University-Purdue University Fort Wayne

Based on comments issued by Harvard University President Larry Summers, a large debate has been provoked regarding women in the fields of math and science. Historically, women have been represented by smaller numbers in scientific disciplines. The common stereotype about women in mathematics and science is rather unflattering. The general myth claims that women are biologically unable to excel in “masculine” fields such as engineering, mathematics, and the sciences. However, further research would indicate that these archaic ideals do not agree with recent statistical developments.

The goal of our study is to test whether the observed differences between participation and representation of men and women in these fields are due to sex or gender differences. That is, the purpose of this paper is to examine biological vs. cultural and social explanations of observed differences. There is a significant difference in terms of consequences for policy makers if the evidence favors one explanation or the other.
The Glass Ceiling: Women Reaching the Top
Bradley Ignasiak
Hedayeh Samavati
Economics
Indiana University-Purdue University Fort Wayne

This paper seeks to examine whether the “glass ceiling” is still problematic and existent in the United States today. While steps to reform and revise business practices to equalize pay grades between the sexes, much of corporate America still follows the tradition of women taking a backseat to men when it comes to salaries and positions of leadership. Taking into consideration education and experience as the two main determinants of pay, the paper seeks to determine whether women are still being discriminated against when equal pay comes into play. The former notion of women as incapable of the same performance as men place them at a disadvantage when it comes to workplace evaluations and promotions as well. The paper examines the evolution of discrimination in the workplace from before the Civil Rights movement in the 1960s and today.

Findings of this paper will help current and future leaders of corporate America if they are interested in removing inequality in their organizations. A more equitable business atmosphere can improve morale among employees and diversify the ideas, talents and skills of an organization therefore improving productivity and profitability.
Perception of Visuotactile Illusion Decreases with Age
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Bruce D. Evans
Biology
Huntington College

Visuotactile illusions arise when visual and somatosensory input are in conflict. Central processes must somehow make sense of these conflicting inputs, and sometimes this results in an illusion that simply does not make sense, but nonetheless is real in the mind of the subject. V.S. Ramachandran has described illusions that arise when an experimenter strokes and taps a tabletop in full view of the subject, while synchronously stroking and tapping the subject’s hand (which is not in view). The illusion that sometimes arises from this scenario is described variously as “the hand is touching my hand through the tabletop” or “the tabletop is a part of my body”. We have explored several aspects of this illusion and have been able to show that the ability of subjects to perceive the illusion diminishes with age. The most dramatic change occurs between the 20’s and 30’s, when the positive responses drop from 51.7% to 22.2%. Secondly, while it seemed to us that females consistently were able to perceive the illusion more often than males, we could not statistically show this to be true (p = 0.07). We also suspected that experimenter bias was a potential problem, since the initial data recorded by Harness, Gensic, Sorg, and Evans were obtained by female experimenters only. Therefore, we collected more data using only male experimenters, only to find that it apparently does not make a difference which gender is involved in collecting data. Overall, we found that 43% of persons aged 10-59 are able to perceive the tabletop illusion.
Visualization of Online Social Spaces
Philip Johnson
Beomjin Kim
Computer Science
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Online social spaces have blossomed over the past few years into an exceptional instrument for the exchange of ideas and opinions on a range of subjects and in forming global communities regardless of location. With this rapid growth in popularity comes a problematic side-effect. The public social spaces are commonly overloaded with contributions and noise. Traditional interfaces for these social environments have inherent limitations when trying to navigate these potentially huge information spaces effectively. This study presents a visual interface, which helps readers to filter out noise, and hone in on pertinent information in discussion forums. With the use of several visual attributes, the developed methodology transforms the text-based messages into visual abstractions. This visual illustration of a discussion forum allows readers to recognize major subjects of discussions, topical transitions over time, and threads including valuable contents intuitively. By creating an interface which focuses the primary user tasks to a far more efficient cognitive process, perceptual cognition, the overall user interaction with the data becomes much more efficient.
The Social Security Delima
Nathaniel Kitrush
Carolyn Stumph
Economics
Indiana University-Purdue University Fort Wayne

With the baby boomer generation quickly approaching retirement, the flaws and misuse of the Social Security system are creating a little bit of a worry. The Social Security system was designed as an insurance program to help those, through times, who truly needed its benefits, not as a retirement plan to be used by every American who qualifies. Generation X is left wondering how to finance Social Security for the vast number of baby boomers set to retire, and whether or not the system is going to exist and be around to assist people in our generation.
Violation of the normality assumption: How serious is it?
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C. K. Chauhan
Mathematics
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The t test is a well known tool for testing the hypothesis for the unknown mean of a population. Such tests are conducted in the areas of Biology, Psychology, Education, Business, and so forth. In order for the t test to be valid, the following assumptions are made: a) the observations are collected randomly, and b) the population from which the data are collected is normally distributed. This research paper investigates the consequences of the violation of the second assumption.

Many experimenters use the t test without ever checking the normality assumption. Checking the normality assumption is also difficult when the sample is small. However, it is worth noting that the effect of departure from the normality is more serious for smaller samples. How do we measure the effect of the violation from the normality when conducting a t test? Well, in a hypothesis test, two types of errors, known as type 1 and type 2 errors are involved. While an experimenter selects the probability of type 1 error in advance (usually 5%), the probability of type 2 error is calculated for different values of the alternatives of the test. A sound test is considered good if the probabilities of errors are small.

In this project we are going to conduct simulation study in which,
a) We will generate 1000 samples of a size n (n = 6, 8, 10, 12, 15, 20) from several different populations such as normal, uniform, exponential, and heavy tailed.
b) For each distribution, a t test will be conducted, and the probabilities of type 1 and type 2 errors will be calculated.

The above simulation study will help us estimate the probabilities of two types of errors when the data are drawn from non normal distributions. The results thus obtained will be compared with the probabilities of errors when the data were drawn from a normal population. The effects of the sample size and the standard deviation on the probabilities of errors for each of the above distributions will also be investigated.
Acting for the good of the group: The role of social identity and rational calculation motives
Keith Leas and Daysha Jackson
Jay Jackson
Psychology
Indiana University-Purdue University Fort Wayne

Individuals must often choose to cooperate with others to maximize a group outcome or act in a way that maximizes personal incentives. When each individual in a group benefits more by defecting than cooperating, the situation is a social dilemma. Traditional theories of choice behavior in social dilemmas have assumed that people’s behavior is individualistic, selfish, and rational in the sense of maximizing personal outcomes. More recent theories have emphasized group identification motives and suggest that people often sacrifice personal gains for the good of the larger group. We conducted an experiment that examined both individualistic and collective motives simultaneously. We predicted that participants in a superordinate condition (common group membership emphasized) would be more cooperative than those in an individualistic condition (individuality emphasized) or a subgroup condition (two distinct groups emphasized). We further predicted that this basic effect would be mediated by social identification (stronger in the collective condition) and rational calculation (e.g., less fear of being taken advantage of in the collective condition) motives. Participants were 140 elementary psychology students. The experimental design was a 3 (collective, subgroup, or individualistic condition) x 2 (academic major or political affiliation as basis for group membership) factorial. In each experimental session, six participants were seated in isolated cubicles. Each was allocated $5 and then had to privately and irrevocably decide to either GIVE or KEEP the endowment. It was made clear that money given would not be returned, but if $20 or more was collected in total all six would receive a $10 bonus (whether or not they personally gave). Several measures were administered, including group identification and rational calculation estimates. Cooperation was significantly greater in the collective condition compared to the individualistic or subgroup conditions. As predicted, participants in the collective condition expressed greater group identification, were less fearful of losing their endowment, and were less concerned with maximizing selfish interests. These motivational items, in turn, predicted rates of cooperation. Suggestions for the theoretical integration of social identity and rational calculation approaches are discussed.
Field data are analyzed in order to see the relationship between the depth of wells and water levels in four wells in our study area. A plot of the average depth below the ground level versus average water level in each well was made. A linear regression equation was derived from the best fit line and its inverse used to write a program (water calculator) that will take either type of data as an input, and will return the resulting value of the other type of data. This water calculator can then be used to simulate the water level in any drilled well within the study area. Once the simulated water level has been verified in the field, the calculator could then be used to predict water levels in any well within the study area.

The water calculator interface consists of two sides. On the left side of the interface is an area for data input, which would be the known piece of data. A simple text field is used to allow the user to input the data value (which will halt the program if the inputted value is a non-numerical value, or out of range). A drop down "combo box" allows the user to select which type of data he or she is entering. The proper equation is then selected to find the resulting type of data, based on the selection the user has made in the combo box. After the input has been entered, a press of the "Calculate" button will make the calculations. The numerical results, as well as a short description of what the resulting output represents, are then printed on labels on the right side of the interface, under the "Output" section. Also displayed is a graphical representation of what the inputted and outputted data represent, including the pipe, ground level, and internal water level. This visual depiction should help the user better understand what the numerical inputs and outputs really represent. This program would help students in understanding the relationship between well depth and well water levels.
Remittances: Are They Good For Mexico?
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The goal of this project is to determine the impact of remittances on the Mexican people and economy. The research will focus on the data that shows the direct and indirect affects of the dollars that are annually remitted to Mexican communities by migrant workers in the United States.
Map-Based Cloning of a Gene Affecting the Uptake of Uracil in *Arabidopsis thaliana*

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Cells obtain their nucleotides for DNA and RNA synthesis via two pathways. One is by *de novo* synthesis from other cellular metabolites and the other is by salvage of purines, pyrimidines, and their corresponding nucleosides that result from the degradation of DNA and RNA. Cells have evolved transporter proteins in their membranes that enable them to uptake extracellular purines, pyrimidines, and their corresponding nucleosides, to be used in making new DNA and RNA. Our lab is interested in identifying the transport mechanism involved in the uptake of uracil which is the precursor for making uridine-, cytidine-, and thymidinie-triphosphates (the pyrimidine nucleotides). Using genetic approaches, our lab had previously isolated a fluoroorotic acid (FOA)-resistant mutant of *Arabidopsis thaliana* that is specifically defective in the uptake of uracil (Mourad et al., 2001). FOA-resistance was due to a single, nuclear, recessive gene *for1* which we mapped to chromosome 5. Here we used polymorphic molecular DNA markers and PCR techniques to fine tune the map location of *for1* in chromosome 5 as a first in its positional cloning. For this purpose, we pollinated FOA-resistant *for1*/*for1* (Columbia ecotype) flowers with pollen obtained from FOA-sensitive *FOR1/FOR1* (Landsberg ecotype) anthers. F1 progeny was allowed to self-pollinate producing F2 progeny which was planted on agar medium supplemented with FOA. Of the F2 progeny, 25% were FOA-resistant (*for1*/*for1*) and were transferred to separate pots and grown for two more weeks. Genomic DNA was isolated from each F2 *for1*/*for1* plant and subjected to PCR amplification using several pairs of primers that amplify polymorphic DNA markers capable of distinguishing the Landsberg and Columbia ecotypes as well as the heterozygotes. The presence of either the Landsberg or the heterozygous banding pattern among the F2 *for1*/*for1* progeny tested was indicative of recombination events between a specific molecular marker and the *for1* gene. Using this approach we mapped *for1* to a molecular marker that is only a few hundred kilobases from the gene.
Training Phonological Awareness in Preschool Children
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Pre-school age children develop pre-reading skills to assist them in learning to read. Skills such as the ability to match sounds of the language with letters or knowing which words rhyme with others are believed to be helpful in learning to read. This study explored traditional and visual methods to see if either method to teach pre-reading skills was better to help young children develop or improve crucial phonological awareness skills of rhyming, syllable identification, number of sounds in words and initial consonant sounds.

Twelve children ages 4.5-5.5 years (six boys and six girls) enrolled in Head Start served as subjects. All but three children were in the poverty classification, two were in low income and one child had a medium income classification. Seven children were living with two parents, five with one parent, their mother. Two children were African-American, 7 were Caucasian, and 3 were Hispanic. Ten children scored as not needing services on the DIAL, two scored below average, eight scored in the average range on the Pre-Kindergarten Screening Test, four scored below average. Three children did not meet the cut-off score for their age on the Phonological Awareness Screening Test. Three children were receiving speech therapy.

Four children were matched by age, test scores and gender for three experimental groups: story (the control group), traditional teaching and visually highlighted teaching. The traditional and the visually highlighted groups engaged in seven sessions doing pre-reading tasks with the researcher. The visually highlighted group had word letters in colors to help the children see initial consonants, rhyme endings and different syllables within words. The traditional group had black letters for the words and relied more on the auditory presentation of the lessons. During the seven sessions, the third group (control) listened to appropriate stories with phonological experiences such as Cat in the Hat.

Pre-testing and post-testing of pre-reading skills will be compared to determine how much change and what specific changes were made from participating in the lessons. These findings and any clinical implications will be discussed during the presentation.
Ontogeny of gut processing and digestion in *Daphnia*: Evidence for a juvenile bottleneck
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We studied relationships between body size and growth rate, ingestion rate, assimilation efficiency, and gut passage time in a clone of *Daphnia pulex* feeding on 4 taxa of green algae that differed in digestibility. Juvenile growth rates at high food concentration ranged from 0.17 per day with digestion resistant *Oocystis* to 0.62 per day with readily digested *Ankistrodesmus* and were tightly correlated with assimilation efficiency. Ingestion rates showed similar allometry across the gradient in digestibility but assimilation efficiency for digestion resistant foods measured with C14 labeled algae declined markedly with decreasing body size. Gut passage time showed a linear decline with decreasing body size. Lower food concentrations lead to increased gut passage time and improved assimilation efficiency for a digestion resistant alga. Our results suggest that increased abundance of digestion resistant resources will cause a growth bottleneck for juveniles and, perhaps, small species of grazers.
A functional food is similar to a conventional food, while a nutraceutical is isolated from a food and sold in dosage form. In both cases the active components occur naturally in the food. Functional foods and nutraceuticals are food components that provide demonstrated physiological benefits or reduce the risk of chronic disease, above and beyond their basic nutritional functions. In our lab we have previously used elemental iodine as nutritional supplement and have successfully increased the immune response in steelhead trout. In the near future, we will use diets containing deficient, adequate or excessive amounts of vitamin C and/or vitamin E in tilapia to investigate potential nutritional interaction and effects on immune responses. In this presentation, effects of functional foods and nutraceuticals on fish health will be discussed.
The Sustained Poverty of the Philippines
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What accounts for the poverty of the Philippines? According to the World Bank, during the years 1985-1995 the Philippines was the only large country in East Asia where the total number of people living on less than one dollar a day did not decline. Currently, 40 percent of the population is considered to be in poverty. Along with receiving lower wages, Filipinos are struck by an average of 10 to 20 strong typhoons and five cyclones each year. They also experience earthquakes on a regular basis because a major fault line passes through the entire length of the Philippines. Along with natural disasters, health problems are also a major concern for the Filipinos. Malnutrition and communicable diseases are common among the Filipino children. Also, non-communicable diseases and cancer are on the rise and are the leading causes of death. The purpose of this presentation is to explain the effect of natural disasters on the economy of the Philippines using the Solow model.

Although the Philippines has had a democratic form of government since 1986, they continue to struggle with economic stability. The large inequality between the poor (40%) and the wealthy and powerful (8-10%) is a growing concern. To help tackle this problem in the Philippines the government should focus on economic growth and stability and develop policies enabling the poor to live in houses and buy food for themselves and their children. Quality improvements should also be made in education and health services.
Richness and Diversity of Anuran Larvae in the Wetlands of Douglas Woods
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Potential relationships between anuran assemblages and wetland characteristics were investigated at a Nature Conservancy site in DeKalb County, Indiana that is currently undergoing wetland restoration. Anuran larvae were collected by dipnet to determine if relationships existed between the occurrence of frog and toad species and wetlands that differed in hydroperiod, canopy cover, length of the wetland/upland boundary perimeter, and age. Dissolved oxygen, pH and temperature were measured to determine whether the ponds differed in water chemistry. Closed-canopy ponds had significantly lower pH and dissolved oxygen levels and significantly cooler water temperatures than open-canopy ponds. Six of the eleven anuran species with ranges in Northeast Indiana were collected and identified. Juveniles of a seventh species were noted observationally. There was a negative relationship between canopy cover and the number of individuals collected and identified. The number of tadpoles identified in closed-canopy ponds (mean = 1) was significantly less than the number identified in open-canopy ponds (mean = 9.8). No relationship was found between diversity (Shannon-Wiener Index) and hydroperiod, canopy cover, perimeter length or pond age. Although not statistically significant, the data suggest that small, newly-constructed, open-canopy ponds have greater species richness (mean = 4.3) than older, open-canopy permanent ponds (mean = 2) or older, closed-canopy temporary ponds (mean = 1). Sampling in closed-canopy sites will be expanded during the second year of the study in an effort to ascertain whether the results from the first year are representative of the anuran populations in these late-succession, forested wetlands.
Inequality in Academia: A Study of Wage and Hiring Inequality
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The wage gap between males and females has gradually subsided following the passage of affirmative action legislation. However, it is crucial that studies be conducted to track such progress to ensure this legislation fulfills its intended purpose. The intent of this paper is to examine the extent of gender wage gap in academia. Also, we study the hiring practices of research universities regarding male and female faculty members.

Recent statements by university officials have made it apparent that sexual discrimination exists among higher education leaders. Harvard University President, Lawrence Summers, suggested in a recent speech that innate differences between the sexes could explain why fewer women succeed in science and math careers. These comments sparked much criticism among female faculty members and increased interest in the apparent wage gap among faculty members. Some studies suggest that equal pay for equal work and equality in hiring practices is not realized in present day academia. Cultural stigmas are largely responsible for such wage and hiring discrimination. This study will investigate whether gender difference is the cause of inequality in the higher education workforce.
Global Counterfeiting and It's Affect on the U.S. Economy
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Global counterfeiting stemming from eastern Asia is considered to be out of control. It has taken a toll on numerous economies around the world, accounting for over 5 percent of world trade in 2004. Global counterfeiting has accounted for lost profits, an increase in trade deficits, lower productivity, and decreased GDP among many nations around the globe.

The U.S economy is one that is being affected by global counterfeiting today. An analysis of counterfeiting throughout the world using trend analysis should show a decrease in economic variables such as productivity, GDP, exports, etc. throughout the United States. The assumption can be made that the increase of global counterfeiting throughout the last decade has had an adverse affect on the U.S. economy.
Spatial Ecology of the Eastern Massasauga Rattlesnake in a Disturbed System
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The Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*) is a species in decline, and is legally protected in every state in which it occurs. Conservation measures have been initiated in many populations in order to facilitate the recovery of this species. Successful conservation of declining species relies on sound biological information as a guide for conservation strategy, but this information is often lacking. For instance, the distribution and movement parameters of snakes within a population are usually unknown, but are some of the most important dynamics to consider in conservation projects. These parameters also provide a means to assessing the impacts of conservation activities, and provide information that allows strategies to be adjusted to minimize negative impacts on local populations. We examined characteristics of spatial ecology in a population of eastern massasaugas located in southeastern Michigan. Although this population is found within protected parkland, a large scale habitat restoration project has caused intensive disturbance of the habitat. We used radiotelemetry to monitor 22 rattlesnakes from 2003-2004, and documented the movement parameters of these snakes within this disturbed system. Snakes demonstrated an average activity range of 5.70 hectares, with an average range length of 379.48 meters. Total seasonal movements averaged 1681.70 meters, with average daily movements of 14.55 meters. Significant differences were documented in the movement parameters of snakes of different reproductive classes (males, females, and gravid females). Snake home ranges overlapped disturbed areas extensively, but the distribution of snake relocations demonstrated that snakes tended to avoid disturbed areas in 2003. Although little direct mortality was observed, disturbed areas present unique dangers to snakes visiting them. In 2004, snakes began recolonizing sections of the disturbed areas as the vegetation was allowed to recover. Our observations suggest that while the restoration project has not had extensive direct negative impacts on this population, and may actually benefit snakes in the long run, management activities may indirectly harm the snake population if allowed to continue for a long period of time.