

The Fourth Annual
Ranger Research Day

Northwestern Oklahoma State University
Alva, Oklahoma ~ April 2, 2010

Student Center Ballroom ~ Alva Campus

ABSTRACTS

*An asterisk denotes a project authored by a NWOSU faculty member;
only student posters are eligible for competition and awards.

Education

3.04 Kinesiology, Health Studies & Special Services

****3.04.01, Project Early - A Program on HIV/AIDS Education, Prevention and Stigma reduction for children***

Dr. Marianne Szauer

This project provided basic HIV/AIDS education to area school children in Grenada (ages 6-12), their teachers, support staff and parents providing an increased awareness and prevention strategy related to HIV/AIDS while attempting to reduce the stigma of HIV/AIDS. The project was able to document a definitive increase in their knowledge about the disease by post presentation questionnaires and surveys of the children, and all others attending the programs.

3.06.02, Factors Related to Procrastination

Kasya Frech and Trent Space (Dr. Nancy Knous, sponsor)

For this study we surveyed college students at a small Midwestern university over social and mental behaviors related to procrastination. We used questions similar to the Tuckman Procrastination Scale, Lay Procrastination Scale, and Big 5 factors of human personality. We found that some factors do seem to have a correlation with procrastination while others do not. Extraversion, agreeableness, and neuroticism were not significantly correlated to procrastination. We found a significant positive correlation between procrastination and openness, and a significant negative correlation between procrastination and conscientiousness.

3.06.03, Procrastination Experiences between Traditional and Nontraditional Students

Stephanie Peetoom and Raylynn McIntosh (Dr. Nancy Knous, sponsor)

Our study was over nontraditional and traditional students and their procrastination habits. We wanted to find out if there was a correlation between the type of student and the level of procrastination being done. We used an anonymous survey to collect the

data; we surveyed students from a small sized university in the southern Midwest part of the United States. Our results showed several factors related to nontraditional and traditional students with procrastination. Examples of a few of our findings that were significantly correlated were: age and not doing things right away were positively correlated; age and studying for a test as soon as the student knows about it were negatively correlated. With the two examples it would seem the older a person is the more likely they are to do things right away and the less likely they are to study extremely early for a test.

Liberal Arts

4.08 Political Science

****4.08.01, Comparative Federalism between Russia and the United States: Ethnic Minority Rights and Ethnic Sovereignty in the Case of the Volga Germans and the Cherokee Nation***

Dr. Aaron Mason and Dr. Eric Schmaltz

This study compares issues of ethnic minority rights and ethnic sovereignty in the Russian Federation (the former USSR's largest successor state) and the United States. Both federative states have made various politico-cultural and national-territorial accommodations for their respective ethnic minorities. This study explores how historical, political, and socio-economic factors have helped shape and transform both systems in relation to their respective ethnic minorities.

The investigation consists of four parts. The first compares Russia and the US as northern hemispheric powers and multinational regions with federative forms of government, including a constitutional analysis of their historical and national development. The second discusses which ethnic minorities are compared in each state and why they were selected. The third integrates the information from the first two parts in an attempt to evaluate the merits and deficiencies of each approach. The fourth concludes on the efficacy and utility of both federative systems and their future prospects.

This study recognizes the historical oscillation of policy formulations toward ethnic minorities in both states, including efforts promoting integration, notions of autonomy and treaty rights, balkanization amid demographic changes, and even tragic episodes of mass population removal. The scope of such a project is indeed vast. Thus this study narrows its approach by comparing two specific ethnic minorities which have each encountered a broad spectrum of government policy approaches. In the American case, relations between the US Government and the Cherokee Nation receive attention. The Russian case is devoted to affairs between the Kremlin and the Volga Germans.

4.09 Sociology & Substance Abuse Studies

4.09.01, The "Millennials" Sense of Self in Society: College Student Identity in an Era of Profound Change

The Sociology Students Research Group - Olivia Hammontree, Leslie Hebert, Ragan Inman, Brittany Jahay, Alicia Kerr, Chase Kokojan, Stephanie Lambert, Kendrick Morgan, Christina Mueller, Seth O'Daniel, Breana Overton, Shea Lynn Pulis, Tenille Smith, Chelsea Wallace, Cody Warfield (Kathleen O'Halleran, sponsor).

This study is aimed at scrutinizing college students' sense of self and social identity. The main group this study concentrated on was Northwestern Oklahoma State University (NWOSU) undergraduate students, who have developed their identities while maturing primarily during the 21st century. Those individuals whose self and social identity has been molded during the post-millennium time period are referred to in this study as "Millennials." These "Millennials" were administered a "Twenty Statements Test" (TST) by a group of NWOSU sociology students to reflect how young adults conceive of themselves in their society. This research was conducted for the purpose of gaining more knowledge from "Millennial" students about the emerging cultural and social dynamics of their era. Because this generation is still rising, little is known yet of their influence on society, or society's influence on them. Some of the main factors that affect this era include the rapid acceleration of technology, the communications revolution, heightened globalization, economic change and shifting social spaces between the ties that normally bind society together. Keeping those forces in mind, in this study we found college students to be dominantly individualistic, as opposed to group or collective orientations. Our findings correlate mainly with TST studies from the mid-1970s-1980s, and also differ from even earlier TST research findings in which college students found the greatest sense of self in society through group solidarity. Though self-oriented is the dominant mode identified by this NWOSU study, overall findings do not show evidence of earlier research studies' predictions of devolving self-identity to the degree of a fracture of the social self among future generations of college students. As student researchers, we have investigated a number of different demographic variables, conversed on what the implications of these trends might be, and considered furthering our study to bring in more information on the "Millennials" sense of self in society.

4.09.02, Community Profile

Stephane Hampton (Dr. Kay Decker, sponsor)

The Tonkawa Business Park recently received site ready certification from the Oklahoma Department of Commerce. Tonkawa was selected to receive a community mural by Mid-America Art Alliance. The two-month Oklahoma mural project will begin in March and will engage Tonkawa citizens of all ages and backgrounds in the development design, and production of a permanent public art piece. Dave Loewanstein, a muralist from Lawrence, Kansas and a specialist in community engagement through public art, will provide consultation to Tonkawa participants as they create their personalized community mural. This project is to be completed in May 2010.

Tonkawa Business Incubator, LLC is a business start-up supporting agency with First National Bank of Oklahoma. Commercial Kitchen is going to be placed in the back section of the Business Incubator. The Commercial Kitchen is designed to be rented out by potential gourmet entrepreneurs. There is a person who is ready to rent the space to prepare his salsa. United Community Action Program has teamed up with Tonkawa's small businesses to offer expansions. They will reimburse \$1,500-2,500 dollars for each new part-time employee and up to \$5,000 for each new full-time employee. Business owners just have to submit pay stubs for the reimbursement. Tonkawa Tribe has the land developed and is in final stages of ground breaking for a new Casino to be located off I-35 and Tonkawa exit.

After speaking with several community development leaders, I feel that Tonkawa has a lot of opportunities to help keep this small rural community growing into the next century. One thing I discovered is that a number of the elderly in this community do not like the idea of agricultural land being turned into future industrial parks or even the future home of bright lights from a new casino. Tonkawa, a stable community based on progressive agricultural, industrial and educational attitudes, is located in Kay County, North Central Oklahoma, on the Salt Fork River. I look forward to continue tracking the progress of this quiet rural community. Tonkawa has the opportunity to grow into an enticing community for potential businesses and attract young families who want to start a family in a low crime-rate society.

4.09.03, The Town of Fort Supply, Oklahoma

Carrie Bridges (Dr. Kay Decker, sponsor)

The community profiled in this research is Fort Supply, Oklahoma. Fort Supply was established in 1903 as Supply, the name was changed in 1943 to Fort Supply. In 1868 Camp of Supply was established by the United States Army until its closing. In 1908 the old army post east of the town became Western Oklahoma Hospital, the first state-operated mental institution. The current population of Fort Supply is 328. According to 11 OS 201, Section 16-207 Fort Supply's Town form, the governing body (2007) is of Aldermanic (Weak Mayor-Council).

- Averaged median housing value is \$52,000.00
- Averaged median mobile home value is \$25,000.00
- Averaged rent is approximately \$450.00 a month.
- At this time there are no housing opportunities and many homes needing upgraded to the average median home value.
- Challenges are: Built Capital: Fort Supply lacks adequate housing units. Land acquisition: Fort Supply lacks financial resources to purchase land for additional housing units. Financial Capital: Lack of adequate financing to upgrade water system. The lack of Economic Development Organizations to increase employment opportunities. Development of services for senior citizens, day care and transportation.

Math and Science

6.01 Biology

6.01.01, Predator Odors as a Potential Repellant for Snakes

Coleman Teel (Dr. Aaron Place, sponsor)

Many Oklahomans, like many people of the world, hold a general dislike or even an overt fear of snakes. Many snakes are killed intentionally or accidentally when they are attracted to areas developed and inhabited by humans. While maligned, snakes serve an important role in nature, both controlling pest species and serving as food for species many humans deem as "good" animals. The purpose of this research was to test the efficacy of the odor of a known snake predator as a repellent. We carried out two experiments to measure the response of neonate garter snakes to the odor of fox urine. The first experiment was a shuttle box experiment where the two ends of a box housed the predator scent or a control and we measured the amount of time spend in each half of the box. The second experiment assessed sensory and avoidance behaviors to cotton swabs saturated in the predator odor relative to a control. The first experiment indicated no avoidance of the predator odor. In the second experiment we found no difference in the number of tongue flicks to the urine or the control, but there were more

reversals away from the urine than from the control. This clearly indicates an innate avoidance to the odor of fox urine. There is potential in this research to create a safe, viable snake repellent to ensure that both humans and snakes can coexist.

***6.01.02, Proximate explanations for differences in learning patterns and decision-making abilities of pitvipers (Viperidae: Crotalinae)**

Dr. Aaron Place

Decision making is at the center of all animal behaviors. However, the paucity of investigations into the mechanism of decision making, particularly among non-primates, combined with the lack of biological relevance of the majority of investigation into these mechanisms has left us with a poor understanding as to how decisions are made mechanistically. Recently, we described an experiment in which we investigated the ability of 13 species of pitviper – 7 rattlesnake and 6 non-rattlesnake pitvipers – to escape from a thermally stressful environment. Though all snakes were able to escape from the stressful environment equally well, rattlesnakes in the study learned to escape in one-trial (i.e., escape in subsequent trials was faster than trial 1), whereas non-rattlesnake pitvipers never decreased their escape time in 12 trials. Here we present a Bayesian statistical approach known as signal detection theory (SDT) to explain the behavior of pitvipers in thermally stressful situations. The main parameters of the model are a prior probability distribution (the probability a hypothesis is true before any evidence is obtained), evidence (neuronal firing rate in the somatosensory cortex), value (living or dying), a decision variable (derived from a likelihood ratio), and a decision rule (a constant based on the likelihood ratio). We present numerical estimates for these parameters that await experimental verification. The SDT model suggests profound differences in the neural processing abilities within the brains of rattlesnake and non-rattlesnake pitvipers. We suggest these changes in neural processing occurred at the divergence of rattlesnakes from the other pitvipers.

6.02 Chemistry

6.02.01, Synthesis of several precursors of new dihydrofolate reductase substrate analogs

Chrystal Benson and Alyssa Logsdon (Dr. Cornelia Mihai, sponsor)

DHFR is one of the most important enzymes involved in DNA biosynthesis and hence an important clinical target. Its role in DNA synthesis is to convert the substrate dihydrofolate (DHF) to tetrahydrofolate (THF) via a hydride transfer reaction. DHF must be constantly reduced to THF by DHFR for the cell to maintain THF-dependent functions, such as cell division. The objective of the proposed research is to synthesize several L-glutamates derivatives (modified at the para-aminobenzoyl moiety or PABA), as precursors for new dihydrofolate reductase (DHFR) substrate analogs. The newly synthesized dihydrofolate (DHF) analogs will have altered pKa values at two key positions of their molecule, namely at the N10 position and, eventually, at the N5 position where the chemical step catalyzed by DHFR occurs. They will be used to develop a better understanding of the mechanism of hydride transfer catalyzed by DHFT and they might be of unique medical importance. The synthesis project presented here consists of three distinctive steps: the protection of the amino group in PABA, synthesis of the dimethyl ester of L-glutamic acid and coupling of the two moieties to yield the final precursors, the modified L-glutamate derivatives.

6.07 Physics and Engineering

6.07.01, *Correlation between Brainwave Activity and Work Metabolic Rate*

Amanda Moyer, Vince Lauderdale, and Chrystal Benson

(Dr. Steven Maier, sponsor)

Different metabolic rates correspond to different activities. To compare the two, we looked at alpha, beta, theta, and delta waves measured by an electroencephalography (EEG) machine in relation to accepted MET values for different physical activities (Ainsworth, 2000). Participants were instructed to look at a blank screen while standing, walking, and running at specific speeds on a treadmill. According to our results, there is a positive correlation between brainwave activity (specifically alpha and beta waves) and gross metabolic rate in humans. On average, standard deviation values increased significantly as subject's metabolic rate increased. The possible correlation could have implications to those who are physically inactive, bed bound, or quadriplegics.