Third Annual
Red River Valley
Statistical Conference

North Dakota State University
Department of Statistics

Wednesday, May 1, 2013

Third Annual Red River Valley Statistical Conference

12:00 pm
Keynote Speaker: Dr. Megan Orr Location: Loftsgard 380
An Improved Method for Computing Q-Values when the Distribution of Effect Sizes is Asymmetric

12:45pm
Refreshment Break Location: Loftsgard 262
Poster Session

Session 1A: Chair: Mrs. Tatjana Miljkovic Location: Loftsgard 380
1:15 pm *Study Multiple Factors of Grade Point Average*, Zach Voels, Nick Weis, & Sarah Ukkelberg
1:30 pm *Cell Phones: What Sells?*, Sebastien Benzi, Chris Barnick & Mehmet Bal
1:45 pm *Nutritional Correlations within Proteins*, John Bickler, Tyler Brink, & Nilmini de Silva
2:00 pm *Analysis of Gross Movie Earnings*, Christopher Adducci, Stephen Anderson, & Ananya Jaidev
2:15 pm *The Relationship between Golf Statistics and Money Winnings on the PGA Tour*, Sarah Storandt, Matthew Tucholke, & Jordan Vansickle
2:30 pm *Popcorn Statistics: Optimal Cooking Method for Microwave Popcorn*, Michael Hoffman & Mohamed Sylla

Session 1B: Chair: Dr. Ron Degges Location: Loftsgard 260
1:15 pm *Study the Number of Divorces in Scotland Over Time (1855-2011)*, Michael Hoffman & Su Hua
1:30 pm *On Periodic Glacial Development*, Joseph Ching & Tyler Hlibichuk
1:45 pm *A Study of the Number of Armed Robberies by Month for Boston (1966-1975)*, Jenn Johnson & Joe Roith
2:00 pm *Identifying optimal coefficients for detecting the presence of a monotonic trend over time in correlated data*, Karl D'Silva
2:15 pm *Predicting Outcomes of NBA Basketball Games*, Scot Jones
2:30 pm *Examining Factors That Affect Point Spread in NBA Basketball Games*, Scot Jones & Adam Sandberg

2:45pm
Refreshment Break Location: Loftsgard 262
Poster Session

Session 2A: Chair: Dr. Gang Shen Location: Loftsgard 380

3:15 pm *Analysis of Significant Factors in Division I Men's College Basketball and Development of a Predictive Model*, Sam Unruh

3:30 pm *New Bracketing Method for Games in the NCAA Men's Division I Basketball Tournament*, Xiao Zhang

3:45 pm *Least Squares Regression for Point Spread and Logistic (Win/Loss) Prediction for NDSU Football*, Tyler Hlibichuk

4:00 pm *Development of a Prediction Model for the NCAA Division-I Football Championship Subdivision*, Joe Long

4:15 pm *An Analysis of Factors Contributing to Wins in the NHL*, Joe Roith

4:30 pm *Football Opponent Scoring Analysis*, Matthew Louwagie Gordon, Danny Luecke, & Davin Loegering

Session 2B: Chair: Dr. Yarong Yang Location: Loftsgard 260

3:15 pm *Robust D-Optimal Design for Response Functions with a Downturn*, Jessica Carter

3:30 pm *Ds-Optimal Design for Model Discrimination in a Probit Model*, Ruifeng Liu

3:45 pm *Predicting Recession in the U.S. with Yield Curve Spread*, Di Huang

4:00 pm *Multiple Testing vs. Multiple Comparisons*, Jamie Kubat

4:15 pm *Boundary Estimation*, Yingfei Mu

4:30 pm *How Do Men Perceive Women with Jewelry?*, Hari Lamitarey

ABSTRACTS FOR SPEAKERS

(in alphabetical order by first author's last name)

Title: Analysis of Gross Movie Earnings
Authors: Christopher Adducci, Stephen Anderson, & Ananya Jaidev

Objective: The objective of the project is to model the gross income of individual movies released within the past five years. Like any other businesses, movie studios desire greater gross income for each movie to ensure profitability. This model will help to accomplish this profitability goal by helping to predict the total revenue based on several of variables. If the chosen variables are significant to the model, then the movie studios can control these variables to achieve greater assurance of consistent profit on each film. The variables used in the model will be based on a variety of attributes of the movies themselves, and their production process. They are as follows: Y = Gross Income, X_1 = Production Budget, X_2 = Number of Theaters upon Release, X_3 = Total Opening Weekends Sales, X_4 = Movie Genre

Data: Data for this project is to be gathered from a variety of Internet databases, predominantly the Internet Movie Database (IMDb), as well as studio press releases containing financial data. This data is widely available online for nearly every major cinematic work.

Analysis: A variety of analysis techniques discussed in class will be used on the model including: ANOVA table, regression coefficients, multicolinearity, residual plots, model selection, model validation, and diagnostics.

Title: Cell Phones: What Sells?
Authors: Sebastien Benzi, Chris Barnick, Mehmet Bal

Objective: Our objective is to find out if there is a correlation between the sales of phones and different variables. Our Y will be the sales of the phones. Our independent variables will consist of; x1 will be the on board storage available, x2 will be the CPU of the phone, x3 will be the Screen resolution, x4, our qualitative variable, will be the Operating system (OS). This price of the phone will be the manufactures price without any contracts, since this would lower the cost and decrease the reliability of our data. We will also only look at more recent models of phones such as the IPhone 5 and Galaxy S4. This will ensure the newest and up to date trends that are in the phone industry. Through this we hope to solve the mystery of whether innovative technology is enough to sell higher numbers in the cell phones in the industry or if people are looking to other variables to buy their phones.

Data: To obtain the data we will be primarily using the internet. We will look on company's websites as well as telephone providers. On the websites we will look at the specs of the phones to collect our data. We will also use different brands to ensure our data is the most reliable and accurate that it can be. To find the total number of sales we will look on company websites, such as Samsung and Apple.

Analysis: To complete this analysis we will use ANOVA table, regression coefficients, multicollineartity, residual plots, model selection, model validation and diagnostics. With these analysis techniques we will be able to determine whether or not a reliable model for our data is accomplishable.

Title: Nutritional Correlations within Proteins
Authors: John Bickler, Tyler Brink, Nilmini de Silva

Objective:

Our objective is to predict the calorie amount of a protein food item depending on the cholesterol, sugar, sodium, and total fat contents in it. So, the calorie amounts of protein food sources (per serving) will be regressed based on cholesterol, sugar, sodium and total fat content.

Methods:

As stated in our objective, our group is looking to predict the calorie amount of a protein food item. We predict that this will be depend on the nutritional values such as cholesterol, sugar, sodium, and total fat. Our main method of obtaining data will be going to local grocery stores and writing down these nutritional values. If one of us cannot drive or is not able to go out, we can look at grocery items online to find the nutritional information needed.

Analysis:

We will input our data into SAS and then run a multiple linear regression on the data. Using diagnostics, regression coefficients, and ANOVA table the model will be validated. If the linear model is not a good fit, we will conclude that the model should be non-linear using model validation. We can then figure out what other type of model makes the best fit.

Title: Robust D-Optimal Design for Response Functions with a Downturn
Authors: Jessica Carter

Researchers studying dose-response relationships must allocate limited resources to design points in order to maximize the information gained from the study. D-optimal design is a well-described design that works efficiently to study model parameters. In order to find the D-optimal design the model that describes the dose-response relationship has to be known. In cases where dose-response relationships show a downturn at high doses, scientists sometimes ignore the downturn to study only the increasing part of the response curve. Here, we have two model choices. Once describes the overall dose-response relationship, and the other describes only the increasing part of the response curve. The D-optimal designs for these two models will be different and the D-optimal design for one model may not work efficiently for the other model. This research studies robust D-optimal design: a design that works efficiently for both models.

Title: On Periodic Glacial Development
Authors: Joseph Ching & Tyler Hlibichuk

The expanse of polar ice level is often paired with the discussion of global temperature and climate change. Determining if there is a change in ice amounts can be very inuential in politics and science. The objective of this research was to determine the trend and seasonality of glacial development based on up-to-date daily data. Furthermore, we apply standard statistical time series methods to predict future observations.

Title: Identifying Optimal Coefficients for Detecting the Presence of a Monotonic Trend over Time in Correlated Data
Authors: Karl D'Silva

A change in model parameters over time often characterizes major events. Situation in which this may arise include observing increasing temperatures, intense rainfall, and the valuation of a stock. The question is whether these observations are simply the result of natural variation, or rather are indicative of an underlying monotonic trend. To this end, we propose an asymptotically normal test statistic that is motivated from a U-statistic. However the form of our test statistic has the advantage of being linear, thus greatly increasing computational efficiency. The problem is now reduced to identifying the optimal coefficients in the class of test statistics possessing the specific form described above. Here, we determine optimality via the minimax criterion. Further consideration demonstrates that the problem can be equivalently reformulated as maximizing the minimal value of a simpler expression, with an additional restriction on the coefficients naturally resulting.

Title: Least Squares Regression for Point Spread and Logistic(Win/Loss) Prediction for NDSU Football
Authors: Tyler Hlibichuk

The basis of this discussion is factors that influence point spread and a win/loss outcome of a NDSU football game. I investigate outcomes through least squares regression modeling and test for the significant factors based on data that is readily available through the NDSU Athletics' Website. In my models, the independent variables I consider are:

1. First Downs
2. Rushing Yards
3. Passing Yards
4. Total Yards
5. Penalties
6. Penalty Yards
7. Turn Over Margin
8. Possession Time
9. Indicators for Year
10. Home/Away

With models I have developed, I will show how point spread and a win/loss can be predicted and how they compare to games produced post model development. From these significant models, the efficiency is investigated.

Title: Study the Number of Divorces in Scotland Over Time (1855-2011)
Authors: Michael Hoffman & Su Hua

We have collected the number of divorces for the country of Scotland. The data was collected from the General Register Office for Scotland. The data runs over 150 years and starts in 1855 and runs through 2011. The idea of a divorce appears to have a different public opinion in modern years compared to pre-World War II. Our goal is model the number of divorces with a time series model and to predict the number of divorces for the next 5 years.

In a time series the data is dependent upon previous or future observations. However, we know the independence has a lot of nice properties and the stationarity of dependent data holds some of these nice properties. This leads us, in time series, to analyze a stationary dataset. There are two components in a time series dataset that we need to eliminate to make the dataset stationary. These two components include a seasonality component and a trend component. From our dataset, we notice that there does not appear to be a seasonality component but we do need to eliminate the trend component over time. After eliminating the trend component, we will then check for stationarity with autocorrelation and partial autocorrelation calculations. These calculations will tell us the best dependence structure to use (autoregressive, moving-average or a combination of the two). After modeling the trend component and the dependence structure, we will use our model to predict the number of divorces in Scotland in the next 5 years.

Title: Popcorn Statistics: Optimal Cooking Method for Microwave Popcorn
Authors: Michael Hoffman and Mohamed Sylla

Microwaving a bag of popcorn is a popular activity among students and Americans in general. However, it can be a tricky and hard task to get the optimal amount of popcorn kernels popped in the bag. A person can microwave a bag of popcorn and only get half the kernels popped in the bag or microwave the bag and burn most of the popcorn in the bag. We plan to run a statistical experimental design experiment to find the optimal power of a microwave and optimal microwave cooking time.

Our design for our experiment is going to be a split-plot design. We plan to run an experiment with 3 different microwaves. This will be the whole plot design structure of the split-plot design. We then will use 3 subplots which will be the power of the microwave. The 3 power settings that we will use are 100%, 90% and 80%. On a microwave, the power setting is the percentage of the cooking time that microwaves are emitted. For each power setting we will then use 3 different cooking times. We will use 3 different cooking times, which include the cooking times of 1:30, 2:00 and 2:30 minutes. Finally, our response variable that we will be measuring is the number of popcorn kernels popped successfully. A popcorn kernel is popped successfully, if it is popped but not burnt. We will count a burnt kernel the same as an un-popped kernel.

Our analysis for this experiment will include analysis on the 2 different treatments (cooking time and microwave power setting) and on 1 block effect (microwave used). It is especially crucial to analyze the block effect in this experiment as all microwaves may not be equivalent in cooking efficiency. Hopefully, our experiment will lead to a general rule for optimal cooking time and optimal microwave power setting for cooking popcorn.

Title: Predicting Recession in the U.S. with Yield Curve Spread
Authors: Di Huang

This paper proposes a hidden Markov model for the signal of U.S. recessions. The model uses the spread of interest rate between 10-year Treasury bond and 3-month Treasury bill, together with other financial indicators which are the real M2 growth, the change in the Standard and Poor's 500 index of stock prices, and difference between the 6-month commercial paper and 6-month Treasury bill rates as predictors. The hidden Markov model considers temporal dependence between the recession signals and provides an estimate of the long-term probability of recessions. The empirical results indicate the hidden Markov model well predict the signal of recessions in the U.S.

Title: A Study of the Number of Armed Robberies by Month for Boston (1966-1975)
Authors: Jenn Johnson & Joe Roith

We examined the monthly number of armed robberies for Boston, MA from January 1966 to October 1975 in order to see if we could develop a time series model for this data and use it to predict the future numbers of armed robberies in Boston. We used the free statistical software R to do the calculations and predictions. The data was taken from the 1977 article entitled The Effect of Massachusetts' Gun-Control Law on Gun-Related Crimes in the City of Boston written by Stuart Jay Deutsch and Francis B. Alt.

Title: Predicting Outcomes of NBA Basketball Games
Authors: Scot Jones

A stratified random sample of 180 NBA basketball games was taken over a three-year period, between 2008 and 2011. Models were developed to predict point spread and to estimate the probability of a specific team winning based on various in-game statistics. The year the games were played did not matter. The models were verified using exact in-game statistics for a random sample taken during the 2011-2012 season, and were found to have an accuracy of 91%. Three methods were used in an effort to estimate in-game statistics of a future game so that the models could be used to predict a winner in a game played by Team A and Team B. Models using these methods had accuracies of approximately 64%.

Title: Examining Factors That Affect Point Spread in NBA Basketball Games
Authors: Scot Jones & Adam Sandberg

Objective
We intend to strengthen an existing regression model by introducing new variables. The new variables to be examined are the differences in turnovers and assists between a team and their opponent. The current model includes the following independent variables: whether the team is playing at home or away, offensive rebounds, and the differences in shooting percentage for field goals, three-pointers, and free throws.

Method
Game statistics will be collected from 150 games for the 21 NBA teams that are currently play-off contenders. The data will be retrieved from the USA Today website. Data from the new sample will be used to compare the estimated coefficients of existing explanatory variables to that of the new variables. All of the variables will then be combined to determine if the model is strengthened by including the new variables.

Analysis
We will consider all of the tools that have been discussed in lecture, such as ANOVA table, regression coefficients, and residual plots, and use them if they are applicable. If these new variables are significant, we can obtain more information to determine the point spread in order to better predict the outcome of NBA basketball games.

Title: Multiple Testing vs. Multiple Comparisons
Authors: Jamie Kubat

Recently, the idea of multiple comparisons has been criticized because of its lack of power in large datasets. Many family-wise error corrections are far too restrictive when large quantities of comparisons are being made. At the other extreme, a test like the least significant difference (LSD) does not control the family-wise error rate, and therefore is not restrictive enough to tell us much of anything. A solution lies in multiple testing. In 1995, Yoav Benjamini and Yosef Hochberg introduced a simple algorithm to control the false discovery rate (FDR) within large datasets. The current research compares FDR to Dunnett's test using agronomic data from a study with 196 different varieties of dry beans. Simulations based off of the real data are also used to assess the tests and look at power. A simulation scenario allows us to better interpret the results found using the real data and verify that the real data is not anomalous.

Title: How Do Men Perceive Women with Jewelry?
Authors: Hari Lamitarey

Women are compared with natural beauty in many cultures. The looks of a women matter to most people. There have been relatively larger and expensive products designed for women to represent her personality and identity compared to men. This paper brings some of the underlying insights towards the level of facial appearance of women. The study is conducted to highlight the attitude and likeness of an average man on the artificial characteristics of women. The study will also measure the characteristic on how men of different age groups perceive the artistic face of women.

Title: Ds-Optimal Design for Model Discrimination in a Probit Model
Authors: Ruifeng Liu

In toxicology studies, dose response functions with a downturn at higher doses are often observed. For such response functions, researchers often want to see if the downturn of the response is significant. A probit model with a quadratic term is adopted to demonstrate the dose response with a downturn. Under the probit model, we obtain optimal designs to study the significance of the downturn and their efficiencies are compared. Our approach identifies the upper bound of the number of optimal design points and searches for the optimal design numerically based on the upper bound.

Title: Development of a Prediction Model for the NCAA Division-I Football Championship Subdivision
Authors: Joe Long

This thesis investigates which in-game team statistics are most significant in determining the outcome in a NCAA Division-I Football Championship Subdivision (FCS) game. The data was analyzed using logistic and ordinary least squares regression techniques to create models that explained the outcome of the past games. The models were then used to predict games where the actual in-game statistics were unknown. A random sample of games from the 2012 NCAA Division-I Football Championship Subdivision regular season was used to test the accuracy of the models when used to predict future games. Various techniques were used to estimate the in-game statistics in the models for each individual team in order to predict future games. The most accurate technique consisted of using three game medians with respect to total yards gained by the teams in consideration. This technique correctly predicted 78.85% of the games in the sample data set when used with the logistic regression model.

Title: Football Opponent Scoring Analysis
Authors: Matthew Louwagie Gordon, Danny Luecke, & Davin Loegering

Objective:
The objective of our analysis is to determine the most important factors that contribute to your opponent scoring against you in the game of football. The factors tested will include Opponent 3rd down conversion percentage, opponent total 1st downs per game, average weight of the defensive line, total rushing yards allowed per game, total passing yards allowed per game, and total turnovers per game.

Data Collection:
The way we intend to collect the data is through sport sites on the internet to include espn.com, sportscenter.com, and cbssports.com. We will gather the data from these sites and compile them into points. We will not be using any other methods of data collection. All of our data will be from the National Football League. We will not be using any college or high school teams.

Types of Analysis:
The types of analysis that we will be doing are ANOVA table, regression coefficients, multicolineraity, residual plots, model selection, model validation and diagnostics. These will be included in our final documentation along with the outputs of SAS.

Title: Boundary Estimation
Authors: Yingfei Mu

The boundary estimation problem has wide applications in diverse fields, such as marine science, epidemiology, and geology. Assume that we observe a data set consisting of independent observations at the nodes of a grid. There might exist an unknown boundary. Our objective is to estimate the boundary if the boundary does exist. Suppose the boundary exist, this unknown boundary separates the grid into two regions. All the observations from a particular region come from a common distribution, but the two distributions are different for the two regions. In this talk, we mainly focus on those cases where the two distributions only differ in their means. The grid is of arbitrary dimension and the mesh is rectangle. We first propose a new estimator to show how our method works. Then we discuss the null distribution of our estimator so we can tell whether the boundary exist or not. Finally, as an illustration, we provide several simulation studies to show that our boundary estimator works pretty well.

Title: Productivity in the United States: Looking at Predicting the GDP based on Underlining Factors
Authors: Andrew Nack, Kyle Ryan, & Akshat Sharma

Our project is designed to investigate the real GDP per capita for the United States of America from 1975 to 2010. We want to look at three variables: the mean wage minus the median wage, unemployment rate, and the percent change in productivity, and, if able, use them to predict the real GDP per capita for some year in the future. We will be using SAS Enterprise Guide 4.3 to analyze our data. From the SAS output, will we use the following test to analyze our data: regression coefficients, Multicollinearity, residual plots, model selection, ANOVA Table, and the F-test. We will conclude with a discussion of our results.

Title: An Improved Method for Computing Q-Values when the Distribution of Effect Sizes is Asymmetric
Authors: Megan Orr*, Peng Liu, & Dan Nettleton

Asymmetry is frequently observed in the empirical distribution of test statistics that results from the analysis of gene expression experiments. This asymmetry indicates an asymmetry in the distribution of effect sizes. A common method for identifying differentially expressed (DE) genes in a gene expression experiment while controlling false discovery rate (FDR) is Storey's *q*-value method. This method ranks genes based solely on the *p*-values from each gene in the experiment. We propose a method that alters and improves upon the *q*-value method by taking the sign of the test statistics, in addition to the *p*-values, into account. Through two simulation studies (one involving independent normal data and one involving microarray data), we show that the proposed method, when compared to the traditional *q*-value method, generally provides a better ranking for genes as well as a higher number of truly DE genes declared to be DE, while still adequately controlling FDR. We illustrate the proposed method by analyzing data from an experiment involving gene expressions in maize leaves.

Title: An Analysis of Factors Contributing to Wins in the NHL
Authors: Joe Roith

The National Hockey League (NHL) is a highly competitive sports industry where each team tries to achieve an advantage over the others in any way possible. The main area of my research is to use season and game statistics to find the factors that most contribute to a team winning an individual game. Data from 240 hockey games from the 2009-10 and 2010-11 seasons was available for modeling. Sixty variables were chosen as potentially significant predictors. Stepwise logistic regression was used to select the variables and create a model that will predict the probability of winning a game, and least squared means regression was used to predict the final goal margin for a game. As a result of this process, I found that save percentage margin, shot margin, block margin, short-handed shot margin, even-handed faceoff percentage, and short-handed faceoff percentage provided the best fit for the model. With these models, I hope to not only predict the outcome of games more accurately but to determine also what areas of the game can be focused on more to generate more wins in the future for teams.

Title: The Relationship Between Golf Statistics and Money Winnings on the PGA Tour
Authors: Sarah Storandt, Matthew Tucholke, & Jordan Vansickle

We have decided to test, using multiple regressions, to see if there is a correlation between different golf statistics and the amount of money won by pros on the PGA tour. We will look at 20 different PGA professionals, and we will look at the 2012 PGA golf season. We have chosen the 2012 season because the 2013 season has just started, and the stats available are not complete. We will use four different variables. We will look at the players driving percentage, green in regulation percentage, scrambling percentage, and one putt percentage. We wish to determine if there is a correlation between these stats and the amount of money the players won during the 2012 season. We will obtain this data by looking at the official stats on the PGA tour website. Our analysis will include all of the concepts done in class, such as the ANOVA table, regression coefficients, multicolineraity, residual plots, model selection, model validation, and diagnostics. We do wish to present at the Red River Statistical Conference.

Title: Analysis of Significant Factors in Division I Men's College Basketball and Development of a Predictive Model
Authors: Sam Unruh

While a number of statistics are collected during an NCAA Division I men's college basketball game, it is potentially of interest to universities, coaches, players, and fans which of these variables are most significant in determining wins and losses. To this end, statistics were collected from two seasons of games and analyzed using logistic and least squares regression methods. The differences between the two competing teams in four common statistics were found to be significant to determining victory: assists, free throw attempts, defensive rebounds, and turnovers. The logistic and least squares models were then used with data from the 2011-2012 season to verify the accuracy of the models. To determine the accuracy of the models in predicting future game outcomes, prior game statistics were collected for teams competing in a sample of games from 2011-2012, with the differences taken and used in the models.

Title: Study Multiple Factors on Grade Point Average
Authors: Zach Voels, Nick Weis, & Sarah Ukkelberg

Our group is doing our Statistics 368 project on what factors affect grade point averages at North Dakota State University. The objective of our project will be to determine how life choices such as how much sleep you get a night, how much alcohol you drink, how many hours a week you work, how many organizations you are actively involved in, how much time you spend studying, how much time you spend for personal time, and if you live on or off campus effect how well students do in college. We feel that this is a good project to show prospective college students as well as current college students how the choices college students make affect how well they do in school. Also, we hope to understand more about what factors play the biggest part in success or failure in college.

To collect data, we will create a survey using the program *Survey Monkey* online. We will have people from our classes take the survey online. We will also post the link to the survey on *Facebook* to get more people to participate in the survey. We will limit the survey so that each person can only take the survey once. We hope that by using the *Facebook* strategy we can increase our sample size and also the variety of majors that our sample will hold. The independent variables in our project will be hours of sleep each night, number of alcoholic beverages consumed in a week, number of hours worked each week, personal time, studying, and on or off campus housing. The dependent variable in our project will be grade point average.

We will use analysis including ANOVA table, regression coefficients, multicollinearity, residual plots, model selection, model validation and diagnostics in SAS Enterprise Guide. With the information that we obtain we hope to determine how each of these factors individually and combined affect grade point average.

Title: New Bracketing Method for Games in the NCAA Men's Division I Basketball Tournament
Authors: Xiao Zhang

This talk presents a new bracketing method for all the 63 games in NCAA Division 1 basketball tournament. Our method based on the logistic conditional probability models is self-consistent in terms of the constructing winning probabilities of each game. Empirical result shows our method outperforms the Ordinal logistic regression and expectation method (OLRE) proposed by West (2006).

ABSTRACTS FOR POSTERS

(in alphabetical order by first author's last name)

Title: Impacts of Supplemental Arginine on Reproductive Performance in Sheep

Authors: A. R. Crane[*†], R. R. Redden[*], M. L. Van Emon[*†], T. L. Neville[*], L.P. Reynolds[*‡], J. S. Caton[*‡], and C. S. Schauer[†]

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In the U.S. sheep industry embryonic and fetal death during pregnancy can account for 25 to 50% of the total number of ovulations. Research from this laboratory has shown supplemental arginine (Arg) can recover embryonic and/or fetal loss in fall lambing ewes synchronized to estrus with exogenous hormones. The objective of this study was to determine the effects of injectable (Exp. 1) and oral (Exp. 2) Arg supplementation provided 2 wk post breeding on reproductive performance of naturally stimulated fall lambing ewes. Rambouillet ewes were exposed to intact rams equipped with marking harnesses to induce cyclicity. Upon estrus detection (d 0), ewes were randomly assigned to one of six treatments for a 14 d treatment period: IV-saline **(CON**; n = 25), IV-alanine (**IVALA**; n = 20), IV-arginine (**IVARG**; n = 23), rumen-protected Arg (**RPARG**; n = 20), corn and soybean meal (**SBM**; n = 23), or corn and fishmeal (**FM**; n = 24). Daily treatments, except CON, IVALA, and SBM, were formulated to provide supplemental Arg at approximately 30 mg/kg ewe BW. Ewes receiving IV treatments were provided 454 g/d corn post-injection. Oral supplements were ground and provided individually to ewes at 0800 daily. Blood samples were collected on d 0, 2, 4, 6, 8, 10, 12, and 14 from 12 ewes per treatment to evaluate serum progesterone concentrations. At lambing, birth weight, birth type, and sex were recorded. Weaning weights were recorded when the average age of lambs was 85 d. No differences ($P \geq 0.35$) were detected for pregnancy and lambing rates or birth and weaning weights among treatments for either experiment. No differences ($P \geq 0.14$) were detected for progesterone concentration for treatment or treatment × day interactions in Exp. 1 or 2. In contrast to previous research, supplemental Arg during the first 14 d of pregnancy did not improve ewe reproductive performance.

Title: The Relationship between Spirituality and Family Privacy: Conceptual Considerations for Communication Privacy Management Theory

Authors: Nancy DiTunnariello

Spirituality may be related to family communication. Relationships within and outside the family may mirror relationships family members have with a higher power. Communication privacy management theory provides a framework to investigate the relationship between spirituality and family privacy orientation, privacy rules, and private topics. Spiritual awareness revealed the strongest relationship between private disclosure within and outside the family. Instability and grandiosity act in opposite ways; an unstable relationship with a higher power was linked to private disclosure within the family, while a grandiose relationship with a higher power revealed a tendency to disclose private information outside the family.

Title: Single or Dual Sourcing: Decision-Making in the Presence of Supply Chain Disruption Risks
Authors: Fesseha Gebremikael

This study focuses on evaluating the impacts of supply disruption risks on the choice between single and dual sourcing methods in a two-stage supply chain with a non-stationary and price-sensitive demand. A simulation approach will be used 1000 times using excel spreadsheet to see the total cost variability and/or comparison between the (2) suppliers, in the presence of supply chain disruption risks. The model takes into account various parameters to see the expected profit of the two sourcing modes and finally identify the choice between the two.

Title: An Analysis of McDonald's Sandwich Serve Times and Sandwich Counts
Authors: John Lauman-Beltz

Usually for-profit businesses, such as McDonalds, love to see their profits increase as much as possible. In the above case, this is done by selling a variety of items like sandwiches while minimizing customer wait time. The objective of this project is to see if average serve times differ during different one-hour periods between 11am and 3pm and also if the number of sandwiches sold in an hour affect kitchen order times at one local McDonald's franchisee here in Fargo ND. The data I will be using is from an actual franchisee store over a four-day period, and it will show as the time of day progresses, sandwich counts and kitchen order serve times vary. Analysis of variance (ANOVA) and simple linear regression will be utilized to show this.