EdPsych/Psych/Soc 589
Applied Categorical Data Analysis
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Final Exam
Due Friday December 14, 4:00 pm

All your work must be your own and independent of others work. You may use the
internet, text, past homeworks, lectures, etc, but may not consult another person until
after the due date. If you have any questions about this exam, please direct them to me
(Carolyn) or the TA (Cory). If you would like me to return your graded work, enclose an
envelope with your campus address.

The variables in the data set are:

- Year

- NamedStorms = Tropical Storms, Hurricanes and Subtropical Storms

- Hurricanes = Saffir-Simpson Hurricane Scale 1 to 5

- MajorHurricanes = Saffir-Simpson Hurricane Scale 3, 4, or 5

- ACE = Accumulated Cyclone Energy - An index that combines the numbers of
  systems, how long they existed and how intense they became. It is calculated by
  squaring the maximum sustained surface wind in the system every six hours that the
  cyclone is a Named Storm and summing it up for the season. It is expressed in 104
  kt2.

- AnnualAnomaly = deviation from average ocean temperature.

I encourage you to go to the following web-sites where I downloaded the data to get more
information about the data and the variables :
    http://www.aoml.noaa.gov/hrd/tcfaq/E11.html
and
    https://www.epa.gov/climate-indicators/climate-change-indicators-sea-surface-temperature

Mini Theory on Climate Change: The burning of fossil fuels by humans has increased
carbon dioxide (green house gases) in the atmosphere, which hasd an increase in the global
temperatures. The resulting increase in ocean temperatures has lead to an increase in
major tropical storms and hurricanes.

You should do the following:

The Data: Report informative basic descriptive statistics, graphs, or both. Be sure to state what you learn about the data from these.

Analysis: This part is broken down by question to be answered

    Question 1: Has the number of named storms per year systematically changed over time? Using the variables available in the data set, do any of these help to predict change?

    Report the following that you use to answer this question:
1. The type of model that you used.
2. Your modeling strategy to arrive at a final model.
3. How you assessed the fit of your final model.
4. Report parameter estimates and tests.
5. Interpret the results.
6. Answer the question 2.

    Question 2: Among the named storms has the proportion of hurricanes changed over time? Using the variables available in the data set, do any of these help to predict change?

    Report the following that you use to answer this question:
1. The type of model that you used.
2. Your modeling strategy to arrive at a final model.
3. How you assessed the fit of your final model.
4. Report parameter estimates and tests.
5. Interpret the results.
6. Answer the question 2.

Discussion :

1. Do your analysis support or consistent with the mini-theory given above? Write a paragraph abound this that incorporates your findings.
2. What are the limitations of this analysis; that is, how could this study be improved?