Week 9 Reading Questions

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1. Even though a customized Maximum Likelihood may have a better or stronger model fit there are benefits from using Least Squares methods and other "canned" or standard methods that may have a weaker fit to one's data. The "canned" methods provide the convenience of stable definitions, convention, computational speed and stability and the facilitations of varying models and comparing hypothesis. When using standard models there already exits a set of definitions that help to simplify parameter estimation. If you can fit a model with unconventional and conventional means it is much easier to communicate and compare to models by using standard methods. Additionally, the convention for using a standard method will create less doubt from a reader of your statistical methods because they are already familiar with the standard models and have a framework for evaluating the validity of one's model without creating confusion.
2. The four key assumptions of the general linear model are:
    1. Normality, which means that the observations will be normally distributed for each values of X.
    2. Homogeneity, there should be equal variance for all X values. This can be checked by looking at the spread of the values of the population in the same for every value X.
    3. Independence, this means that there is an assumption of independence between each observation, or that a particular X value should be independent from the other X values.
    4. Fixed x, we know exactly where X is and there is no noise.
3. Even if the response variable is not normally-distributed the assumption of normality can be met in a general linear model because what should be normal are the residuals of the model. The response variable values do not even need to be normal for the use of a linear model. The residuals can be plotted in a histogram to visualize and validate the normality of the model.