Imagine that you have a new manager or colleague at work who is skeptical of detailed statistical analysis.  They are suspicious of data-driven decisions and prefer to 'go with their gut' and make business decisions based on intuition.  You want to persuade them of the value of statistics.  Choose three (3) core concepts or topics from our syllabus that are relevant to your work, and write an essay explaining how you would try to convince this person of their usefulness in your work.  You may use symbols, equations, formulas etc. if you find them helpful to your case, but be sure to define their components and explain what they mean.  
  
If you find it helpful to assume a hypothetical scenario or project for your answer, that's fine.  Just be sure to describe your setup and be specific.  You should write at least one separate paragraph for each major concept or topic that you choose, and you should be able to state your case in no more than 2 pages.  You should structure your essay as effectively as you would a written essay for an in-person class, with appropriate opening and closing, etc.  Remember that the quality of your writing is more important than the quantity. (100 points)

Wooddale Church is home to 10,000 members and around 100 full-time staff. At the hierarchy of the organizational structure, pastors manage all aspects of the churches operations. In order for one to become a pastor, one must complete a lengthy Master of Divinity (MDiv). Through an MDIV, one gathers biblical training, language skills, and communication training. Qualitative skills such as statistics are not stressed or required for an MDiv. Subsequently, decisions are often made ‘from the gut’ with little thought given to data-driven statistics. Since starting my Master of Science in Predictive Analytics (MSPA), I have been able to utilize statistical techniques utilizing data to inform decision makers. Specifically, I have persuaded management to utilize the value of the t-test and standard deviation to better understand who attends our services, use different levels of data for attendance reports to better analyze program performance, and apply appropriate measures of dispersion to more accurately define our member demographic information. Through my use of statistical techniques, I have demonstrated to management the importance of quantitate, data-driven decision making to improve the overall organization.

Any given Sunday 6,000-8,000 people attend Wooddale Church during one of their five services. At every service, a pastor who is sitting in service discetly conducts a head count. Attendee’s are asked to fill out an attendance card, and about 450-550 people fill out an attendance card each service. The attendance card is then entered into Wooddale’s Fellowship One (F1) database, which has ongoing records of attenders. I used the information cards from each service as a sample population of the entire service from which the attendance cards were gathered. F1 created an electronic report in the form of an excel document for all the attendance. Selecting data for age and service attended, I imported the data into SPSS. Using the sample data, I ran the standard deviation and mean. Suprisingly, the data followed a relativley normal ditribution. I had a very large degree of freedom seeing that my sample populations was around 450-550 per service. Seeing that I knew the population size I conducted a t-test. From this information, I could commmunicated to management with a 99% confidence interval the average age of attenders and the related standard deviations of age at each of Wooddale’s five services. One of the head pastors replied, “Now that I know that 68% of the attenders are within ten years of my age I can tell better analogies to my stories targeting that age group.” From my brief time in statistics, it was great to apply the techniques of standard deviation and t-score confidence intervals to demonstrate the importance of data-driven decision making to my management.

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One of the programs I manage is refugee tutoring program. The program works with over 135 students throughout the school year. From learning about the different aspects of data, I created an attendance sheet that was ratio level data, meaning zero equaled lack of attendance. Through this grouping, I was able to rank, sort, and analyze the past years attendance. Importing this information into SPSS I created a histogram of attendance by students and found that 5 families representing 25 students accounted for 85% of our overall attendance. I also created a scatter plot showing student age and attendance, from which I learned high school students attended more often. I shared this information with management and changed our strategy to communicate and coordinate with the five key families to better maintain program consistency. Using the techniques of different data measurement, I demonstrated to management the effectiveness of precisely knowing and measuring program attendance.

In the past, management utilized the measure of dispersion known as the arithmetic mean, or mean, to generalize program age for participants. I demonstrated that the arithmetic mean can be misleading if one has polarity of ages in the populations being measured. Using the frequency distribution for median position formula (sum of f +1/2), I showed that the median was a better indicator of program age participation. For the evening programing, the mean was about 55, but the median was 35. After further analysis, I was able to communicate to leadership that there was a population of older people in this particular program that was skewing the traditional measurement. The median revealed that the middle person’s age in attendance was 35. From this information, management has changed programming to better accommodate the younger population.

Through persuasively demonstrating to management the value of statistical techniques, I am slowly changing ‘the gut’ decision making model to incorporate data-driven decision making. Utilizing standard deviation, t-scores, confidence intervals, measures of data, and measures of dispersion, Wooddale Church operates more effectively and is better tuned to meet the needs of its members.