**Statistics # 6 – T-test**

1. If an athlete has to accelerate their body mass over a short distance, then it is seemingly advantageous to have a relatively low percentage of body fat. The world record in the men’s 200 m dash (running) is 19.19 s, while the world record in the men’s 50 m freestyle (swimming) is 20.30 s. Both records were set in 2009 by Usain Bolt and Roland Schoeman, respectively. As both disciplines require moving as fast as possible for about 20 s, it would seem reasonable to expect that athletes from both events would have similar fitness characteristics (e.g., % body fat). However, buoyancy is an important consideration for swimming but not running. A more buoyant swimmer experiences less drag from the water and may focus more on moving horizontally than on maintaining their vertical position. The associated Excel file contains data from the world’s top competitors in each discipline. Conduct the appropriate statistical test to address the following question. **Do Olympic 50 m freestyle swimmers have a higher % body fat than Olympic 200 m runners.**
2. The jump float serve has become a very popular serve at the elite level in volleyball. Currently, the technique is executed using a late toss and relatively small jump to ensure solid contact with the ball. The current method may be referred to as the Contact Focused technique. It is possible to execute a jump float serve with an earlier toss and maximum height jump. The higher contact point potentially allows the server to hit the ball with more velocity without serving past the end of the court. This novel method may be referred to as the Jump Focused technique. The associated Excel file contains data for a group of volleyball players in which each player executed both techniques. Conduct the appropriate statistical tests to address the following questions. **1) Does the Jump Focused technique result in a higher contact point?** **2) Does the Jump Focused technique result in higher ball speeds?**

Instructions

1. Download the Excel file “Statistics # 6 – T-test” from my webpage and save the file as “Last Name First Name Statistics #6” e.g. “MacKenzie Sasho Statistics #6”. Remember to change the file name when saving to your H: drive.
2. Follow the instructions in the spreadsheet and refer to the various readings and class notes.
   1. T Test - Ch.8 Vincent.pdf
   2. 007 Comparing Means from Two Data Sets- The T-test.ppt
   3. <http://en.wikipedia.org/wiki/Effect_size#Cohen.27s_d>
   4. [Dunlap 1996 Effect size for paired t-tests.pdf](http://people.stfx.ca/smackenz/Courses/HK396/Handouts/Dunlap%201996%20Effect%20size%20for%20paired%20t-tests.pdf)
3. You can conduct your analysis in either Excel or SPSS.
4. Email your Excel file to the class Gmail account. Type “Statistics #6” as your **Subject**.