

TSJ | Homework Example 1

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Learning objectives

1. create filters in JASP
2. calculate measures of central tendency and variability in JASP
3. differentiate between descriptive and inferential statistics
4. create and interpret histograms and boxplots

Dataset: download link will be available on Canvas We will use a modified version of the NFL Combine data set (ref needed). The data set can be downloaded from this link: <https://osf.io/tbgfh/>

Note that you will be required to apply/remove filters when completing some of the required analysis for this assignment¹.

Open the data set in JASP and proceed to answer the following questions²:

Question 1

Filter: apply a filter to Position so that only Wide Receivers (WR) and Safety (S) are included in this analysis.

For the variables Heightin and Weightlbs, compute the following: mean, median, standard deviation, min, max, and sample size (n).

Provide below the **Descriptive Statistics** Table:

Table 1: Descriptive Statistics - DEMONSTRATION				
	Heightin		Weightlbs	
	S	WR	S	WR
Valid	25	43	25	43
Missing	0	0	0	0
Mean	71.920	72.674	206.320	203.651
Median	72.000	73.000	207.000	202.000
Std. Deviation	1.681	1.835	7.609	11.284
Minimum	69.000	69.000	191.000	182.000
Maximum	76.000	76.000	218.000	234.000

¹Refer to this link for help: <https://bit.ly/37RPncf>

²Questions are worth 10 points

Question 2

Filter: remove all filters before proceeding!

Considering the nature of both dependent variables used in Question 1 and assuming the distribution of scores for both variables are **approximating normality**, which measure of central tendency should be reported (mean, mode, or median)? Explain.

Question 3

In questions 1, you calculated the measures of central tendency and variability, which fall under the category of descriptive statistics. Discuss the difference between **descriptive statistics** and **inferential statistics**. More complete answers will receive more points.

Question 4

Filter: apply a filter to Position so that only Quarterbacks (QB) are included in this analysis.

Using the variable BroadJumpin, calculate the range, standard deviation and the IQR for Quarterbacks (QB) ONLY.

Provide below the **Descriptive Statistics** Table:

Table 2: Descriptive Statistics - DEMONSTRATION

	Heightin		Weightlbs	
	S	WR	S	WR
Valid	25	43	25	43
Missing	0	0	0	0
Mean	71.920	72.674	206.320	203.651
Median	72.000	73.000	207.000	202.000
Std. Deviation	1.681	1.835	7.609	11.284
Minimum	69.000	69.000	191.000	182.000
Maximum	76.000	76.000	218.000	234.000

Question 5

Filter: remove all filters before proceeding!

In Question 1, you were asked to calculate the standard deviation of height (inches) and weight (lbs). Suppose you want to compare the standard deviations of height and weight. How the two standard deviations compare?

Question 6

When calculating the sample variance and standard deviation, JASP uses $N-1$ in the denominator (see below). In your own words, explain why $N-1$ is used instead of N .

Standard Deviation equation for the sample:

$$\sigma = \sqrt{\frac{\sum(x-\mu)^2}{N-1}}$$

Variance equation for the sample:

$$s^2 = \frac{\sum(x-\bar{x})^2}{N-1}$$

Question 7

The variance and the standard deviation are the two most common measures of variability reported in research manuscripts. Let's say the manuscript you submitted for publication was returned by the editor. The editor-in-chief has asked you to report either the variance OR the standard deviation. Which one would you pick and why?

Question 8

Filter: apply a filter to Status so that **only** Year 2 is included in this analysis.

The variable "Status" refers to players who were either tested during the first or second year. Run an analysis to calculate the mean, and standard deviation for the variable Shuttle.

Provide below the **Descriptive Statistics** Table:

Table 3: Descriptive Statistics - DEMONSTRATION

	Shuttle
Valid	78
Missing	42
Mean	4.433
Std. Deviation	0.266

Question 9

Create a histogram for the variable Shuttle and add the density line to it.

Provide the histogram create by JASP below and state whether the distribution of scores for Shuttle appears to be deviating or approximating normality. In this particular case, disregard other sources of normality (skewness, kurtosis, QQ-plots, Shapiro-Wilk test, etc.).

Provide below the **histogram** graph:

Question 10

Create a histogram for Shuttle using ggplot2 as the color palette. Did the creation of the boxplot reveal any outliers? Explain.

Provide below the **boxblot** graph: