Center & Spread (cont.) and
Weighted Means

Present Monday: 13.2 #24, 27 and 13.3 #3*

9:55 Jena Wei., Rebekah, Luke, Arie, Kelly, Leigha Bla.
11:00 Molly Wag., Tyson, Colin, Janessa, Mykki, Brittany Ene.

Homework for tomorrow: Sec. 13.2 #30, 47*, 57, and (**) below.
* Also find the mean absolute deviation (m.a.d.) in #47
** Compare the following datasets using mean and m.a.d.):
A = {1, 3, 6, 8, 10, 10, 11, 14, 15, 22}
B = {6, 9, 10, 13, 14, 15, 15, 18, 23, 27}

Present tomorrow: #30, 57, and (**)
9:55 Alexis Blo., Ashley, Mae, Aspyn, Abby, Kelly Buc.
11:00 Lauren Eng., Katie, Courtney, Sarah, Tyler, Melissa Hla.

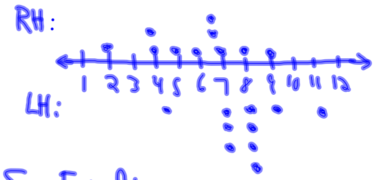
Statistics and Probability **7.SP**

3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*

(For our ruler-drop data (left- versus right-handed), we should attempt to express the difference in means in terms of the variability of the data set)

RH: 8, 7, 2, 4, 4, 7, 6, 5, 7, 9;   mean = 5.9
LH: 8, 9, 11, 8, 7, 8, 7, 7, 4, 8; mean = 7.7

RH is 1.8 inches "faster" on average.



See Excel:
The 1.8 in. difference between LH & RH datasets represents 1.25 times the average variation in the data.
This suggests RH reaction times are actually "significantly" faster than the LH times.

Several Possible Measures of Spread:

Range = max - min

*Mean Absolute Deviation = d = $\dfrac{\sum_{i=1}^{n}\left|x_i - \bar{x}\right|}{n}$

add — the ith data point — mean

Median Absolute Deviation = m = median$\left(\left|x_i - M\right|\right)$

*Standard Deviation = $s = \sqrt{\dfrac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2}{n-1}}$

Interquartile Range -- The range of the middle 50% of the ranked data set. (More on this when we examine box plots)

Calculating ~~Mean Absolute~~ Standard Deviation by Hand...

Data Point, x (inches)	Deviation: $x-\bar{x}$ $x_i - 7$	Square of deviation: $(x-\bar{x})^2$
x_1 = 3	-4	16
x_2 = 7	0	0
x_3 = 8	1	1
x_4 = 10	3	+ 9
		26

$s = \sqrt{\dfrac{\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2}{n-1}}$

$n = 4$

$\bar{x} = \frac{28}{4} = 7$

$s = \sqrt{\frac{26}{3}} \approx 2.9$ inches

Calculating Mean Absolute Deviation by Hand...

Data Point, x (inches)	Deviation: $x-\bar{x}$	Absolute deviation: $\left|x-\bar{x}\right|$
3	-4	4
7	0	0
8	1	1
10	3	+ 3
		8

$d = \dfrac{\sum_{i=1}^{n}\left|x_i - \bar{x}\right|}{n}$

$= \frac{8}{4} = 2$ inches

Additional Topics:

1) Using TI-calculators to calculate descriptive statistics.
2) Using Excel to calculate descriptive statistics.

(Use ruler-drop data...)

Return Exam 1

Scoring codes on each problem are translated into points as follows:

3 ~~~> 100% (1 pt)
2.5 ~~> 90% (0.9 pts)
2.0 ~~> 70% (0.7 pts)
1.5 ~~> 55% (0.55 pts)
1.0 ~~> 40% (0.4 pts)
0.5 ~~> 20% (0.2 pts)
0 ~~~> 0% (0 pts)

1) 3
2) 2.5
3) 1
#

If you scored below 65%, see me for a chance to demonstrate your proficiency (cannot earn > 65%, but you can recover some points).