

### Lesson Summary

Variability is a natural occurrence in data distributions. Two data distributions can be compared by describing how far apart their sample means are. The amount of separation can be measured in terms of how many MADs separate the means. (Note that if the two sample MADs differ, the larger of the two is used to make this calculation.)

### Problem Set

- A school is trying to decide which reading program to purchase.
  - How many MADs separate the mean reading comprehension score for a standard program (mean = 67.8, MAD = 4.6,  $n = 24$ ) and an activity-based program (mean = 70.3, MAD = 4.5,  $n = 27$ )?
  - What recommendation would you make based on this result?
- Does a football filled with helium go farther than one filled with air? Two identical footballs were used: one filled with helium and one filled with air to the same pressure. Matt was chosen from your team to do the kicking. You did not tell Matt which ball he was kicking. The data (in yards) follow.

<b>Air</b>	25	23	28	29	27	32	24	26	22	27	31	24	33	26	24	28	30
<b>Helium</b>	24	19	25	25	22	24	28	31	22	26	24	23	22	21	21	23	25

	Mean	MAD
<b>Air</b>		
<b>Helium</b>		

- Calculate the difference between the sample mean distance for the football filled with air and for the one filled with helium.
- On the same scale, draw dot plots of the two distributions, and discuss the variability in each distribution.
- Calculate the MAD for each distribution. Based on the MADs, compare the variability in each distribution. Is the variability about the same? Interpret the MADs in the context of the problem.
- Based on your calculations, is the difference in mean distance meaningful? Part of your reasoning should involve the number of MADs that separate the sample means. Note that if the MADs differ, use the larger one in determining how many MADs separate the two means.

3. Suppose that your classmates were debating about whether going to college is really worth it. Based on the following data of annual salaries (rounded to the nearest thousands of dollars) for college graduates and high school graduates with no college experience, does it appear that going to college is indeed worth the effort? The data are from people in their second year of employment.

<b>College Grad</b>	41	67	53	48	45	60	59	55	52	52	50	59	44	49	52
<b>High School Grad</b>	23	33	36	29	25	43	42	38	27	25	33	41	29	33	35

- Calculate the difference between the sample mean salary for college graduates and for high school graduates.
- On the same scale, draw dot plots of the two distributions, and discuss the variability in each distribution.
- Calculate the MAD for each distribution. Based on the MADs, compare the variability in each distribution. Is the variability about the same? Interpret the MADs in the context of the problem.
- Based on your calculations, is going to college worth the effort? Part of your reasoning should involve the number of MADs that separate the sample means.