

1. Greg was 14, Marcia was 12, Peter was 11, Jan was 10, Bobby was 8, and Cindy was 6 when they started playing the Brady kids on The Brady Bunch. Cousin Oliver was 8 years old when he joined the show. What are the mean, median, and mode of the kids' ages when they first appeared on the show? What are the variance, standard deviation, and standard error?

Ages = 14,12,11,10,8,8,6

Mean = 9.8 years

Median = 10 years

Mode = 8 years

Variance =  $[(14-9.8)^2 + (12-9.8)^2 + (11-9.8)^2 + (10-9.8)^2 + (8-9.8)^2 + (8-9.8)^2 + (6-9.8)^2] / (7-1) = 7.5$

Standard deviation =  $(7.5)^{1/2} = 2.7$  years

Standard error =  $2.7 / (7)^{1/2} = 1$  year

2. Using these estimates, if you had to choose only one estimate of central tendency and one estimate of variance to describe the data, which would you pick and why?

With this population: Mean and standard deviation. Though with age data I would be suspicious of a skewed distribution (where I may choose median and quartile range), here the mean and median are close and the distribution does not appear to be skewed.

3. Next, Cindy has a birthday. Update your estimates- what changed, and what didn't?

Ages = 14,12,11,10,8,8,7

Mean = 10 years

Median = 10 years

Mode = 8 years

Variance =  $[(14-10)^2 + (12-10)^2 + (11-10)^2 + (10-10)^2 + (8-10)^2 + (8-10)^2 + (7-10)^2] / (7-1) = 6.3$

Standard deviation =  $(6.3)^{1/2} = 2.5$  years

Standard error =  $2.5 / (7)^{1/2} = 1$  year

Since Cindy's age moved closer to the first mean, the variation, standard deviation, and standard error decreased. The mean also increased. The median and mode remained the same (they are less sensitive to changes in individual points).

4. Nobody likes Cousin Oliver. Maybe the network should have used an even younger actor. Replace Cousin Oliver with 1-year-old Jessica, then recalculate again. Does this change your choice of central tendency or variance estimation methods?

Ages = 14,12,11,10,8,7,1

Mean = 9 years

Median = 10 years

Mode = NA

Variance =  $[(14-9)^2 + (12-9)^2 + (11-9)^2 + (10-9)^2 + (8-9)^2 + (7-9)^2 + (1-9)^2] / (7-1) = 18$

Standard deviation =  $(18)^{1/2} = 4.2$  years

Standard error =  $4.2 / (7)^{1/2} = 1.6$  year

The change in the small population was not drastic, but the population is now recognizably skewed. I may change to describing central tendency and variance to median and quartile range ( median = 10, Q1 = 11.5, Q3 = 7.5)

5. On the 50th anniversary of The Brady Bunch, four different magazines asked their readers whether they were fans of the show. The answers were: TV Guide 20% fans Entertainment Weekly 23% fans Pop Culture Today 17% fans SciPhi Phanatic 5% fans Based on these numbers, what percentage of adult Americans would you estimate were Brady Bunch fans on the 50th anniversary of the show?

Assume that subscribers of the four magazines represent equally all US adults with respect to interest in the Brady Bunch.

Assume no intersection among subscribers.

65% of American adults were fans ( $20 + 23 + 17 + 5$ )