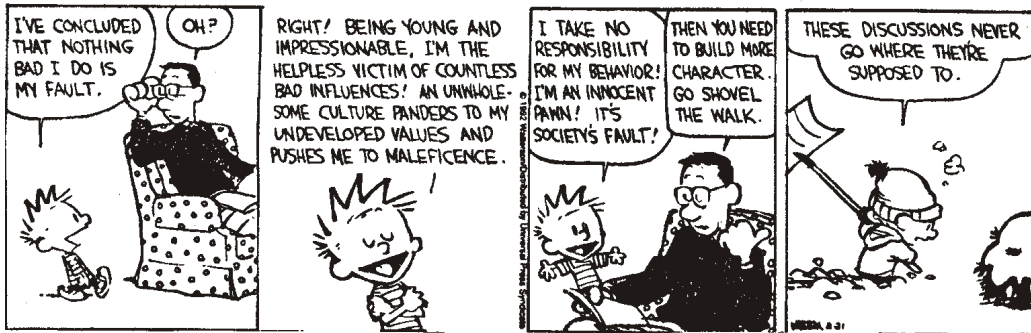


Homework 6 (Measures of Variability)

Due: Monday Dec. 6th (10 pts)

CALVIN AND HOBBS By Bill Watterson

CARTOON 5.2



1. Let's say we also collect information on the number of authoritarian orders ("you will do it because I say so" or "you will do it or else") our children's parents make daily. Our findings are reported in Table 5.7.

- Calculate the range.
- Treat this as a sample and calculate the variance and standard deviation using the appropriate formula ($n = 20$).
- Treat this as a population and use the appropriate formulas to calculate the variance and standard deviation.
- Which is larger, the sample standard deviation or the population variance? Why is one larger than the other?

Table 5.7 Daily Number of Authoritarian Orders Parents Give Their Children

<i>Number of Orders</i>			
6	3	2	3
12	1	11	7
4	4	2	14 ($n = 20$)
11	9	6	7
7	10	3	9

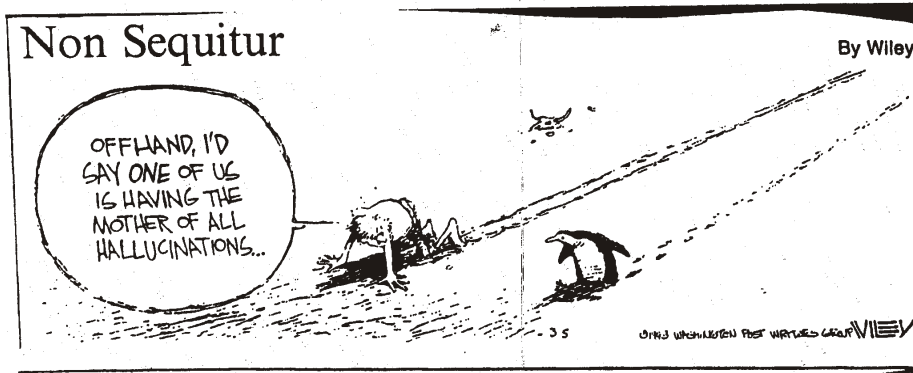
2. Let's say that instead of 6-year-olds we are now interested in the number of times 13-year-olds question parental authority in a day's period. Using 25 research subjects, we find the following reported in Table 5.8.

- Calculate the range.
- Treat this as a population and calculate the variance and standard deviation using the appropriate formulas ($N = 25$).
- Treat this as a sample and use the appropriate formulas to calculate the variance and standard deviation.
- Are these answers different than those found for the six-year olds? If so, why?

Table 5.8 Number of Times 25 Thirteen-Year Olds Question Their Parents' Authority in a Day's Period

<i>Number of Times Authority is Questioned by Thirteen-Year Olds</i>				
8	23	5	7	15
11	29	16	6	27
10	14	3	14	18 ($n = 25$)
21	18	12	8	9
17	23	11	10	22

Cartoon 5.1



3. Referring back to Cartoon 5.1, let's say our present research interests are the number of penguins a given person sees once s/he starts to hallucinate. We sample 15 people and find the following, expressed in terms of number of penguins seen during desert crawler's hallucination. (See Table 5.9)

- Calculate the range.
- Treat this as a sample and calculate the variance and standard deviation using the appropriate formulas ($n = 15$).
- Treat this as a population and use the appropriate formulas to calculate the variance and standard deviation.

Table 5.9 Number of Penguins Seen During Hallucination

<i>Number of Penguins</i>		
6	3	2
12	1	11
4	4	2 ($n = 15$)
11	9	6
7	10	3

Table 5.10 Frequency of Hallucinations for Statistics and English Students

<i>Number of Penguins Hallucinated by Each Student</i>			
<i>Statistics</i>		<i>English</i>	
$(n = 22)$		$(n = 22)$	
10	20	1	20
11	21	1	21
13	21	5	24
14	22	6	27
15	22	9	29
17	23	11	29
18	25	11	31
18	26	13	34
19	27	16	35
19	29	19	39
20	30	20	39

4. A statistics professor notices that her students often complain during class about having hallucinations involving penguins. She decides to assess the frequency of student's penguin hallucinations for students during statistics class and for students during introductory English class. The data for each class is presented in Table 5.10.
- Find the sample variance and sample standard deviation for the statistics students.
 - Find the sample variance and sample standard deviation for the English students.
 - What conclusions can you draw about the frequency of students' penguin hallucinations in these two courses?