1. **The theory of a confidence interval (and statistical inference in general).**
   
   (a) Inferences are about parameters. And parameters are related to a specific variable or variable defined on the population.
   
   (b) Inferences are never certain.
   
   (c) Inferences come with an explicit statement of the uncertainty.
   
   (d) Probability statements are about the process of inference, not the particular inference we make (probability is about the future).
   
   (e) Inferences are based on assumptions about the sample and about the population.

2. **Confidence intervals for $\mu$.**
   
   (a) Condition on sample
   
   (b) Assumption about the population
   
   (c) The $t$-distributions
   
   (d) Violations of the assumptions

3. **Sampling distributions.**
   
   (a) Every statistic is a random variable.
   
   (b) Therefore every statistic has a distribution.
   
   (c) We don’t know the distribution of the statistic because we don’t know the distribution of the population.

4. **Estimates of parameters**
   
   (a) Bias
   
   (b) Variance

5. **The distribution of the sample mean.**
   
   (a) The mean of the sample mean
   
   (b) The variance of the sample mean
   
   (c) The shape of the distribution of the sample mean

6. **Continuous random variables.**
   
   (a) Models of populations or processes (“theoretical” populations)
   
   (b) Have means and variances just as variables do.
In a trial of the cholinesterase inhibitor physostigmine (PHYS) on 10 male patients with moderate to severe obstructive sleep apnea, PHYS (0.12 g/minute/kg, 7-hour infusion) reduced mean apnea/hypopnea index (AHI) by 13.6 (95% confidence interval [CI], 2.2 – 25.1).

Suppose that Kelloggs chooses and weighs a random sample of 12 boxes of Raisin Bran from a given day’s production. Suppose on the basis of this sample, they announce that a 95% confidence interval for the mean weight of a box of Raisin Bran is 11 ± .2 ounces. Indicate which of the following are correct interpretations of this claim. (Any one of these might be correct or incorrect!)

1. There is a 95% probability that a randomly chosen box of Raisin Bran will weigh between 10.8 and 11.2 ounces.
2. Approximately 95% of all Raisin Bran boxes will weigh between 10.8 and 11.2 ounces.
3. If we would choose another sample of 12 boxes, the probability is 95% that the average weight of those 12 boxes is between 10.8 and 11.2.
4. If we choose another sample of 12 boxes, the probability is 95% that a confidence interval we construct from those 12 boxes will contain the mean of all boxes produced on that day.
5. The probability is 95% that the true average weight of all Raisin Bran boxes produced on this day is between 10.8 and 11.2.