

Review Statistics Concepts

1. Variable
2. Categorical variable
3. Nominal variable
4. Ordinal variable
5. Quantitative variable
6. Interval variable
7. Ratio variable
8. Why we need to both graphically & numerically describe a variable's distribution, & the logic involved in deciding by means of the graphic evidence if the numerical statistics will be valid representations of the data
9. How we graphically describe a variable's distribution
10. How we statistically describe a variable's distribution
11. How we deal with outliers
12. Properties & weaknesses of mean & standard deviation; principal alternative statistics; & why mean & standard deviation are used so much despite their problem
13. Linear transformation
14. Density curve
15. Normal distribution & why it's important
16. Are all symmetrical distributions normal?
17. Standard normal distribution & how it's used
18. How to standardize a quantitative variable, & how to re-calculate an original raw score from a standard score
19. Association
20. Direct causation, common response & confounding
21. Bivariate scatter plot & how to describe it
22. Lurking variables
23. How to describe the distribution of a quantitative variable by a categorical variable
24. Correlation, its properties & its limitations
25. How to combine correlation with a categorical variable
26. Ecological correlation (i.e. correlation of averaged data)
27. Restricted-range data & attenuated correlation
28. Regression, its properties & limitations, & its advantages over correlation
29. Population
30. Census
31. Sample; voluntary response sample & probability sample
32. Parameter
33. Statistic
34. Experimental study & its advantages
35. Randomization & control, & why they're important
36. Observational study & its disadvantages
37. Simple random sample
38. Stratified sample
39. Cluster sample
40. Bias
41. Variability
42. The most basic ways to reduce sample data's bias & variability
43. Inferential versus descriptive statistics
44. Randomness, probability & random variable

45. Expected value & why we use it
46. How to combine the means & the variances of two random variables
47. Sampling variability
48. Sampling distribution
49. Population distribution
50. Sampling error
51. Non-sampling error
52. Standard error
53. Difference between standard deviation & standard error
54. Why a mean is typically used to estimate a parameter
55. Law of Large Numbers
56. Sampling distribution of a sample mean
57. Central Limit Theorem [see note for #69]
58. What's a count & a proportion
59. What's the binomial setting
60. How we compute the mean & standard deviation of a count & a proportion
61. Binomial test
62. Confidence interval
63. Hypothesis test
64. Statistical significance
65. Difference between statistical & practical significance
66. Confidence interval & its formula [see note for #69]
67. Hypothesis test & how it's conducted [see note for #69]
68. Type I & Type II errors, & power
69. The statistical assumptions of confidence intervals & hypothesis tests, & how we use graphics to assess the assumptions [Note: Regarding Central Limit Theorem, what matters for confidence interval is that the sampling distribution of the sample mean approximates normality.]
70. One & two-sample t-tests
71. One & two-sample tests of proportions
72. What's a contingency table; what kind of data it uses, & what are its statistical assumptions; what's conditional association; & what are a contingency table's components. How we assess association within a contingency table
73. Simpson's Paradox
74. Spurious non-association
75. True or false, & why: To obtain roughly equal variability in the statistics collected, we must sample a larger percentage of the population in Calcutta, India than in Orlando, FL, USA
76. True or false, & why: You have data for an entire population. Next step: construct confidence intervals for the variables & test hypotheses.
77. True or false, & why: "The P -value of .13 leads me to accept the null hypothesis."
78. True or false, & why: " $r = .873$, thus definitively proving that x causes y ."
79. Make up (or copy) & plot a bivariate scatterplot with a negative correlation; a bivariate scatterplot with zero correlation; & a bivariate scatterplot with a positive correlation. For each scatterplot, state the null hypothesis & the alternative hypothesis.
80. In a class of 36 students, the mean math test score is 53 with standard deviation 11, but you score 57. What's your standard score? What percentage of students scored lower than you? What percentage scored higher than you?

81. In #77, use the standard score & other pertinent measures to re-calculate the original raw score.
82. All of a firm's employees—from the highest to lowest paid—receive a 3% pay raise. What's the effect on the firm's earnings distribution?
83. All of a firm's employees—from the highest to lowest paid—receive a \$1000 pay raise. What's the effect on the firm's earnings distribution?