Pearson New International Edition

Statistics and Research Methods
Becoming a Psychological Detective
Stephen F. Davis Randolph A. Smith
First Edition

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4. Positive *z* scores are based on raw scores that are _____.
   a. below the mean b. above the mean
   c. from different distributions d. from the same distribution
5. Negative *z* scores are based on raw scores that are _____.
   a. below the mean b. above the mean
   c. from different distributions d. from the same distribution
6. *z* scores are useful because _____.
   a. they allow researchers to make accurate predictions
   b. they allow researchers to compare scores from the same distribution
   c. they allow researchers to compare scores from different distributions
   d. they come exclusively from bimodal distributions
7. Researchers hope that an interval estimate will include a _____.
   a. a unimodal distribution
   b. a bimodal distribution
   c. a population parameter
   d. an independent variable
8. When compared to a 95% confidence interval, a 99% confidence interval is _____ likely to include the population characteristic of interest.
   a. less b. more c. equally d. These two intervals cannot be compared.

EXERCISES

1. A researcher recorded the following scores:

   17, 26, 11, 82, 16, 23, 39, 42, 8, 28, 33, 38, 19, 14

   Calculate the range.
2. Calculate the variance for the data in Exercise 1.
3. A researcher selects 25 samples from a population. The means of these samples are:

   17, 24, 27, 22, 19, 28, 16, 14, 16, 27, 31, 26, 16, 19, 30, 15, 28, 18, 17, 25, 17, 20, 21, 15, 18

   What is your best estimate of the population mean?
   What is the variance of this distribution of means?
   What is the SEM?
4. Establish the 95% and 99% confidence intervals for Exercise 3.
5. You had a grade of 83 on your last psychology test. Other relevant information: $M = 76.80$, $SD = 3.10$
   Convert your grade to a *z* score and interpret this *z* score.
6. Calculate the range, variance, and *SD* for the following distributions:
   a. 0.10, 0.22, 0.33, 0.44, 0.55, 0.66, 0.77
   b. 10, 22, 33, 44, 55, 66, 77
   c. 100, 220, 330, 440, 550, 660, 770

7. On a measure of self-esteem the mean is 60 and the *SD* is 10. Convert each of the following scores to a *z* score.

67, 52, 78, 81

8. Calculate the deviation score for each of the following scores:

1, 2, 3, 4, 5, 6, 7, 8,

Calculate the variance using the deviation score formula. Calculate the *SD*.

9. A year after their parents divorced, the female and male children completed an adjustment scale. The female child scored 68 (M for females = 60, SD = 4.75), whereas the male child scored 71 (M for males = 63, SD = 5.47). Which of these children has made the best adjustment? Explain your answer (be sure to include the results of your calculations in your explanation).

10. Present the results from Exercise 9 as a graph.

11. Find the mean, median, sum of squared deviations, variance, and *SD* for the following data:

2.0, 1.6, 4.1, 3.4, 2.8

12. Five people have the following *z* scores on Test 1 (M = 50, SD = 5). What are their raw scores?

Person 1, z = 2.00 Person 2, z = 1.50 Person 3, z = 3.00 Person 4, z = 1.26

Person 5, z = −1.86

13. Assume that a population has a *SD* of 15. Calculate the SEM (i.e., *SD*) of the distribution of means for the following samples:

n = 4, n = 9, n = 16

14. Calculate the 95% and 99% confidence intervals for each of the following data sets:

	Population *M*	Population *SD*	Sample size	Sample *M*
Set 1	20	4	20	18
Set 2	100	10	100	107
Set 3	50	6	50	42

15. Calculate the raw score for each of the following:

a. z = 2.08, SD = 6.31, M = 27.14

b. z = 0.73, SD = 21.42, M = 111.06

c. z = −1.47, SD = 4.78, M = 12.68

d. z = 3.81, SD = 12.49, M = 38.17

KEY TERMS

Variability
Range
Variance
Deviation score
Standard deviation (*SD*)
Normal distribution
Kurtosis
Leptokurtic

Mesokurtic	*z* score
Platykurtic	Interval estimate
Distribution of means	Parameter
Standard error of the mean (SEM)	Confidence interval

Check Your Progress Answers

Check Your Progress

1. Because it takes into account only the highest and lowest scores and disregards the distribution of scores in between, the range does not convey much information.
2. a
3. Because the percentage of scores occurring between the mean and any standard deviation (e.g., +1, +2, −1, −2) away from the mean is constant, standard deviation scores from one distribution can be compared with standard deviation scores from other distributions.
4. a
5. c

Check Your Progress

1. c
2. The standard error of the mean is useful because it tells you how much variability you can expect to find in the population from which you drew the sample(s) in your research.
3. d
4. b
5. a
6. c
7. c
8. b

Answers to Exercises

1. Range = 82 − 8 = 74
2. Variance = 329.78
3. Best estimate of population mean = 21.04
   Variance = 26.92
   SEM = 5.2953
4. 95% confidence interval = 10.6613 − 31.4187
   99% confidence interval = 7.4311 − 34.6489
5. $z = 2.00$ 97.72% (50 + 47.72) of the students scored below this score
6. a. range = .67, variance = .0494, standard deviation = .2222
   b. range = .67, variance = 493.55, standard deviation = 22.216
   c. range = 670, variance = 49355.55, *SD* = 222.16
7. a. $z = .70$ b. $z = -.80$ c. $z = 1.80$ d. $z = 2.10$

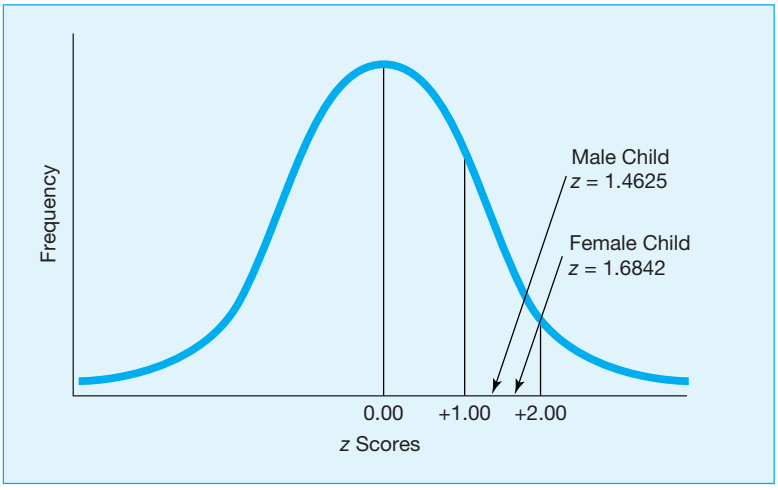
8.

Score	Deviation score
1	−3.50
2	−2.50
3	−1.50
4	−.50
5	.50
6	1.50
7	2.50
8	3.50

Sum of squared deviation score = 42 Variance = 42/8 = 5.25 *SD* = 2.2913

9. Female child *z* = 1.6842 95.35% scored below the female child
Male child *z* = 1.4625 92.79% scored below the male child
Conclude that the female child is making a better adjustment because she had a higher *z* score. Therefore, her score was in a higher percentile than the male child's score.

10.



11. Median = 2.8 Mean = 2.78 Variance = .826 *SD* = .9088
12. Person 1 = 60 Person 2 = 57.50 Person 3 = 65 Person 4 = 56.30
Person 5 = 40.70
13. a. SEM = 7.50 b. SEM = 5.00 c. SEM = 3.75
14. Set 1—95% confidence interval −17.0644–53.0644
99% confidence interval −27.9773–63.9773
Set 2—95% confidence interval −89–303
99% confidence interval −150 − 364
Set 3—95% confidence interval–41.1628–125.1628
99% confidence interval −67.0457–151.0457
15. a. 40.2648 b. 126.6966 c. 5.6534 d. 85.7569

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The Basics of Experimentation II: Final Considerations, Unanticipated Influences, and Cross-Cultural Issues

Participants

Types of Participants

Number of Participants

Apparatus

IV Presentation

DV Recording

The Experimenter as an Extraneous Variable

Experimenter Characteristics

Experimenter Expectancies

Controlling Experimenter Effects

Participant Perceptions as Extraneous Variables

Demand Characteristics and Good Participants

Response Bias

Controlling Participant Effects

The Interface Between Research and Culture

Culture, Knowledge, and Truth

The Effect of Culture on Research

Methodology and Analysis Issues