STATISTICS for the BEHAVIORAL SCIENCES

SECOND EDITION

Gregory J. Privitera

Statistics for the Behavioral Sciences

Second Edition

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STATISTICS FOR THE BEHAVIORAL SCIENCES

SECOND EDITION

Award-winning author Gregory J. Privitera engages students in an ongoing spirit of discovery with **a focus on how statistics apply to modern research problems**. Fully updated with current research, robust pedagogy, and a new four-color design, this new edition includes even more real-world examples.

Real-world examples make statistics relevant for students.

Example 2.1 applies the steps for distributing the frequency of scores in a data set.

Example 2.1

A topic of interest in industrial organizational psychology is studying issues of worker safety (Brondino, Silva, & Pasini, 2012; Loughlin & Frone, 2004). To study this topic, a researcher records the number of complaints about safety filed by employees of 45 local small businesses over the previous 3 years. The results are listed in Table 2.3. In this example, we can construct a frequency distribution of these data.

TABLE 2.3

45	98	83	50	86
66	66	88	95	73
88	55	76	115	66
92	110	79	105	101
101	85	90	92	81
55	95	91	92	
78	66	73	58	
86	92	51	63	
91	77	88	86	
94	80	102	107	

The number of safety complaints that employees at 45 local small businesses filed over the previous 3 years.

Step 1: Find the real range. The smallest value in Table 2.3 is 45, and the largest value is 115; therefore, 115 − 45 = 70. The real range is 70 + 1 = 71.

Step 2: Find the interval width. We can split the data into eight intervals (again, you choose the number of intervals). The interval width is the real range divided by the number of intervals: $\frac{71}{8}$ = 8.88. The original data are listed as whole numbers, so we round up to the nearest whole number. The nearest whole number is the degree of accuracy of the data. The interval width is 9.

Step 3: Construct the frequency distribution. The frequency distribution table is shown in Table 2.4. The first interval starts with the smallest value (45) and contains nine values. To construct the next interval, add one degree of accuracy, or one whole number in this example, and repeat the steps to construct the remaining intervals.

"One of the most important things I learned as an undergraduate in psychology was that psychology wasn't just a bunch of interesting things to know but that it is an open field of study where real-world things could be discovered. This book gives that to students."

—Joshua J. Dobias, *Rutgers University*

Example 7.3

Participants in a random sample of 100 college students are asked to state the number of hours they spend studying during finals week. Among all college students at this school (the population), the mean study time is equal to 20 hours per week, with a standard deviation equal to 15 hours per week. Construct a sampling distribution of the mean.

To construct the sampling distribution, we must (1) identify the mean of the sampling distribution, (2) compute the standard error of the mean, and (3) distribute the possible sample means 3 *SEM* above and below the mean.

Because the sample mean is an unbiased estimator of the population mean, the mean of the sampling distribution is equal to the population mean. The mean of this sampling distribution is equal to 20. The standard error is the population standard deviation (15) divided by the square root of the sample size (100):

$$\sigma_M = \frac{\sigma}{\sqrt{n}} = \frac{15}{\sqrt{100}} = 1.50.$$

10.3 The Related-Samples *t* Test: Repeated-Measures Design

Two designs associated with selecting related samples are the repeated-measures design and the matched-pairs design. In Example 10.1, we compute the related-samples *t* test for a study using the repeated-measures design. In Example 10.2 (in Section 10.5), we compute a study using the matched-pairs design.

Example 10.1

One area of focus in many areas of psychology and in education is on understanding and promoting reading among children and adults (Kent, Wanzek, & Al Otaiba, 2012; White, Chen, & Forsyth, 2010). Suppose we conduct a study with this area of focus by testing if teacher supervision influences the time that elementary school children read. To test this, we stage two 6-minute reading sessions and record the time in seconds that children spend reading in each session. In one session, the children read with a teacher present in the room; in another session, the same group of children read without a teacher present. The difference in time spent reading in the presence versus absence of a teacher is recorded. Table 10.5 lists the results of this hypothetical study with difference scores given. Test whether or not reading times differ using a .05 level of significance.

Step 1: State the hypotheses. Because we are testing whether (=) or not (≠) a difference exists, the null hypothesis states that there is no mean difference, and the alternative hypothesis states that there is a mean difference:

$H_0: \mu_D = 0$	There is no mean difference in time spent reading in the presence versus absence of a teacher.
$H_1: \mu_D \neq 0$	There is a mean difference in time spent reading in the presence versus absence of a teacher.

FVI

The null and alternative hypotheses make statements about a population of mean difference scores.

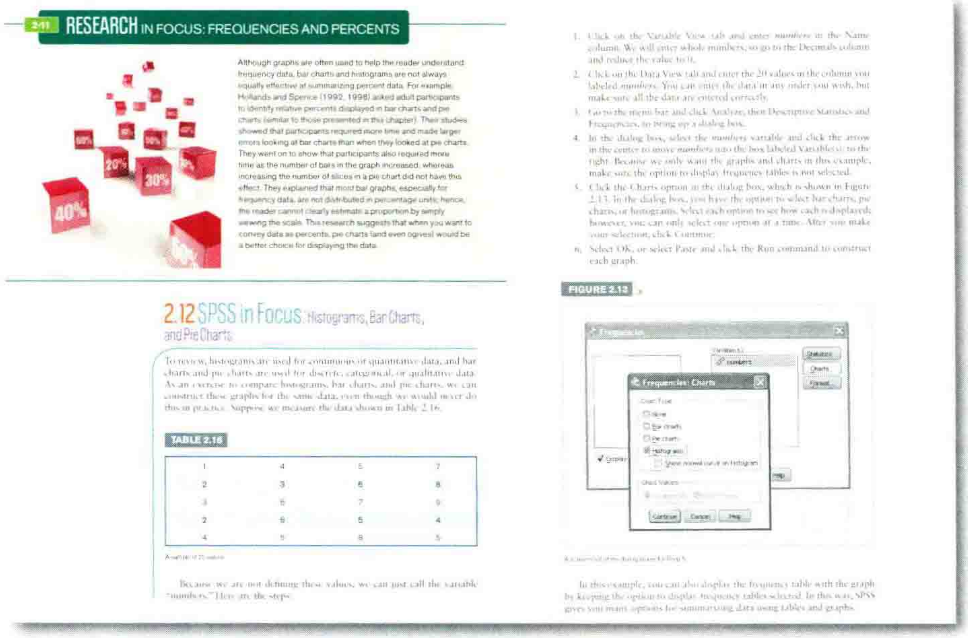
"I loved the book in the first-edition form and love it even more from the changes I have reviewed. I will continue to use the text and recommend it to colleagues."

—Jeffrey Kinderdietz, *Arizona State University*

A FOCUS ON CLARITY

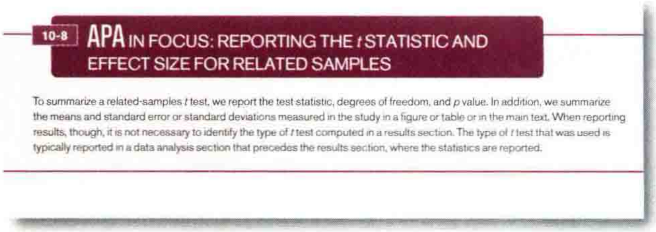
Research in Focus sections provide context by reviewing the most current research that illustrates the most important statistical concepts.

SPSS in Focus sections (with screenshots) draw from practical research examples to demonstrate how chapter concepts can be applied with SPSS.



"The SPSS coverage is exceptional."

–Walter M. Yamada, *Azusa Pacific University*



APA in Focus sections explain how to read and report statistical results in journals using current APA style.

"APA in Focus *is really useful for introducing students to the reporting standards from their very earliest exposures to these ideas."*

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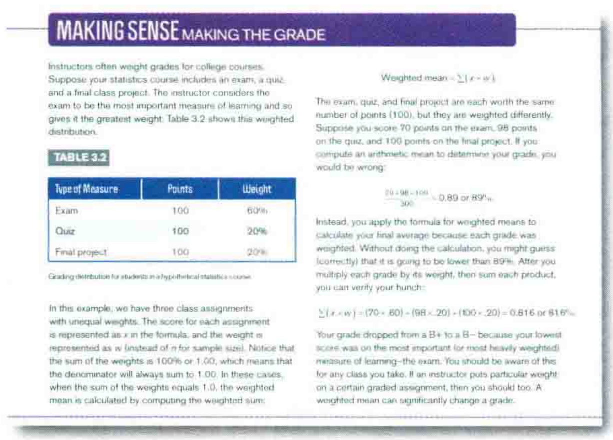
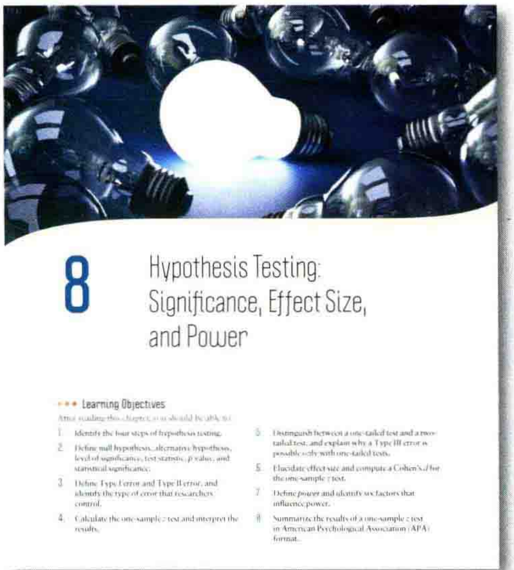
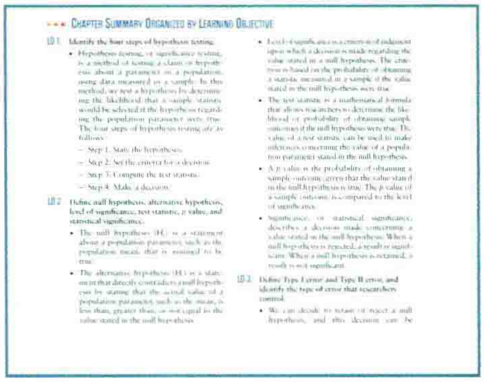
Making Sense sections break down the most difficult concepts in statistics.



A FOCUS ON PEDAGOGY AND PRACTICE



Chapter Learning Objectives are revisited and explained in **Chapter Summaries**.

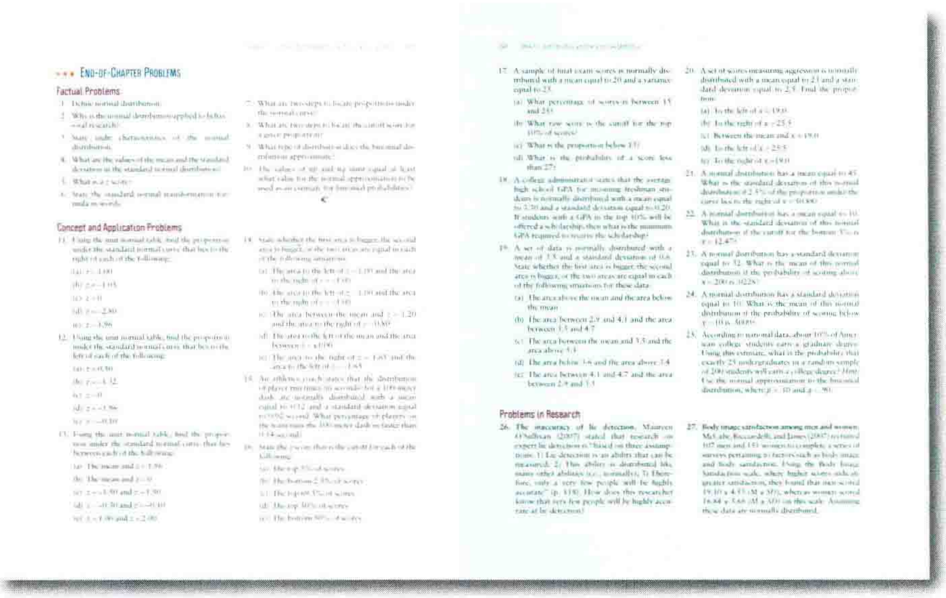


Learning Checks with answers appear throughout each chapter, helping students assess their understanding of key concepts.

LEARNING CHECK 4

1. State the two steps for locating the cutoff score for a given proportion of data.
2. What are the *z* scores associated with the following probabilities toward the tail in a normal distribution?
   (a) .4013 (b) .3050 (c) .0250 (d) .0505
3. State the *z* score that most closely approximates the following probabilities:
   (a) Top 10% of scores
   (b) Bottom 10% of scores
   (c) Top 50% of scores

Answers: 1. Step 1: Locate the *z* score associated with a given proportion in the unit normal table. Step 2: Transform the *z* score into a raw score (*x*). 2. (a) $z = 0.25$, (b) $z = 0.51$, (c) $z = 1.96$, (d) $z = 1.64$; 3. (a) $z \approx 1.28$, (b) $z \approx -1.28$, (c) $z = 0$.



"I like the objectives, the readability of the text, the straightforwardness of the presentations of concepts, the problems that are quite appropriate on many levels (computation, theory, etc.), and the emphasis on SPSS."

—Ted R. Bitner,
DePauw University

More than 30 problems (organized by type) at the end of each chapter provide a wealth of opportunities for practice.

A FOCUS ON RESOURCES

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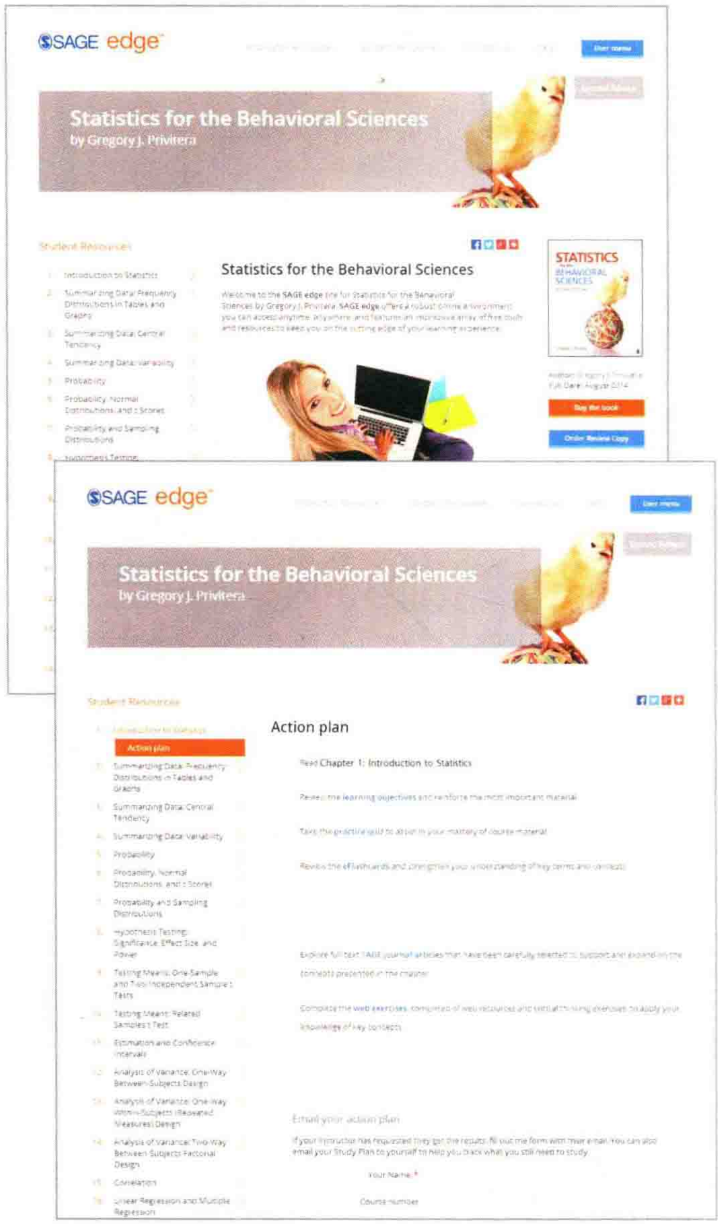

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"I think the resource package is excellent."

—Ronald W. Stoffey,
Kutztown University of Pennsylvania

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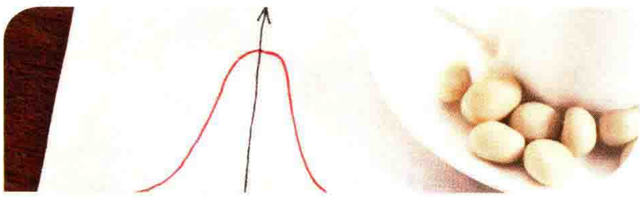
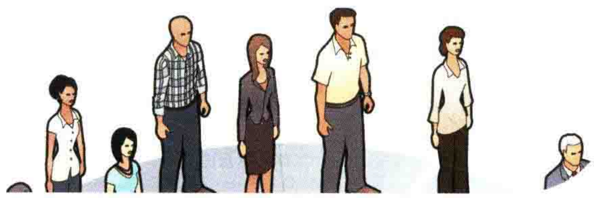
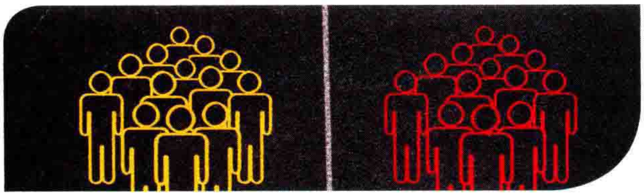
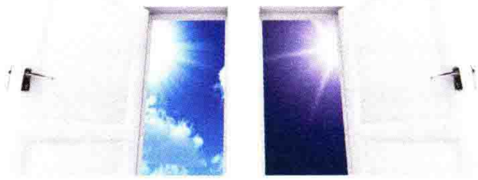
Detailed Contents


Your odds – 3:1









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