

Chapter 1

Introduction

Why Are You Reading This Book?

If you are reading this book, chances are that you are enrolled in a statistics class. From my experience, very few people (unless they are a little “strange”) read a book about statistics unless they have to.

What are your thoughts and expectations as you begin reading? Perhaps you are a little apprehensive because you have had a lot of bad experiences with math. If so, then maybe you fear that this experience will simply be more of the same.

On the other hand, maybe you are okay with math. In that case, perhaps you see taking statistics as just another hurdle that you have to jump over on the long road to getting a degree or advancing in your career.

Let me share with you a couple of things from my own experience with statistics that may help put both this book and the class you are likely taking into better perspective. First, I was one of those students for whom math did not come easy. Although I have always been interested in science and read just about everything I could get my hands on as a child, I simply did not do well in a traditional educational environment. I can still remember sitting in high school algebra trying to understand a concept called “factoring”. For some reason it just didn’t click with me at the time.

I raised my hand and asked the teacher to explain it again but the explanation only made my confusion worse. In the end, I simply felt stupid and I stopped asking questions. Needless to say, I didn’t learn much about algebra in high school. Have you ever had an experience like this?

On another occasion I tried to take a geometry class. I really wanted to do well in this course. In an effort to “stack the deck” and to help ensure that I would do well, I sat in the front row and prepared to put as much work into it as needed to get an “A”.

From the beginning, however, things went down hill. I found it difficult to understand nearly everything that the teacher said about geometry. I still remember sitting there trying to pay attention but my eyes kept getting heavier and heavier. Once I put my head down “just for a minute” only to wake up 45 minutes later to a dark and empty classroom with the lights off and the door locked! Does this describe how you feel about math?

The teacher actually called my parents to inform them that “I think your son may be involved in drugs because he is finding it difficult to pay attention and is sleeping in class.” That teacher had no idea just how much I wanted to learn geometry and I was simply too embarrassed to get the help I needed.

What is the point of these stories from my own deep, dark past? Simply this: Psychology has taught us that people do not all learn in the same way and at the same time. Our brains develop so that some of us are able to learn things at one age that others will not be able to grasp until years later. For some people, learning in a classroom setting is very easy. For others, they find it easier to learn when they see how what they are studying can be applied in a practical and real-world setting.

For example, while I found math difficult throughout high school, once I got to college I suddenly found that it seemed pretty easy. What made the difference? I believe

that it was simply a matter of *time*. My brain “grew up” until it was ready to grasp concepts that are mathematical in nature.

Now let me tell you something about statistics that I have never read in any textbook and have never heard from a statistics teacher—yet I have found it to be true.

Statistics is one of the most important topics you will study as a psychology student. For that matter, it could be one of the most important classes you take no matter what major you plan to complete.

Why do I say this? Because my personal experience has demonstrated to me over and over that it is true.

I have worked as a Personnel Management Consultant with a large consulting firm. I have collaborated with the United States Department of Labor and the United States Defense Manpower Data Center on a project to develop a test to identify the best people for jobs. I have worked as a Test Validation and Development Specialist, and a developer of personnel and executive selection systems. Additionally, I have been employed as a Research Analyst and later as Chief of Research and Performance Outcomes Development at the California State Department of Mental Health.

When I applied for each of these jobs (as well as others), nobody ever asked me whether or not I had taken a class in human sexuality (a perennial favorite among psychology students) nor did they ask me if I took classes in abnormal psychology, personality theory or counseling theory. Now, don't get me wrong. I am not saying that these are not important classes. On the contrary, they are *very* important. The reality is, however, that all psychology students take these classes. So what sets prospective mental health professionals apart from one another? How does a hiring manager decide who would make the largest contributions to their organization?

While serving as Chief of Research and Performance Outcomes Development at the California Department of Mental Health, I had the opportunity to train and interact with many hundreds of mental health professionals (therapists and counselors). In nearly all cases, I have found that one of the keys to getting higher paying jobs in both the government and private setting is whether or not the therapist has a solid understanding of statistics and research methodology.

Why would this be the case? Like most things, it has a lot to do with money. During times of budget shortfalls and increased competition for financial resources, those who fund mental health services such as governments and insurance companies are requiring that mental health service providers conduct ongoing assessments of the “outcomes” resulting from the provision of mental health services. In order to do this, one needs to know how to conduct studies and analyze data. This means that someone needs to understand how to use and interpret statistics. Since many people shy away from learning statistics, when managers identify employees who have those skills they tend to rapidly promote them.

Additionally, many organizations are increasingly interested in seeking public and private grants to help them fund their operations. Almost all such grants require that the

recipient of the funds document the effectiveness of the programs that they are supporting.

Often, companies are willing to pay a high price for private consultants to help them analyze their data. Whenever they find a potential employee who has the skills to do it, they fall all over themselves to hire that person because it saves the company a lot of money!

In areas outside of counseling, an understanding of statistics can be just as much or even more critical. Below are some examples:

- Statistics are often applied to identifying applicants who would make the best employees.
- Businesses and marketing consultants use statistics to develop and test marketing campaigns to find out which ones work best.
- Public opinion researchers use statistics to help political candidates and others know how the public is feeling about something (you may be surprised that this is more involved than simply asking a bunch of people what they think!)
- Automobile companies, the United States Air Force, NASA and others use statistics to design control panels, dash boards and work spaces that help people perform at their maximum efficiency.
- Sports researchers use statistics to identify and predict who will make the best athletes.
- Beer companies use statistics to confirm that all of their products conform to the same high standards (how would you like that job...beer tester?).
- Ice cream companies use statistics to decide which new flavor of ice cream would be most accepted by the public (I want that job!)
- And the list goes on and on and on!

Jobs that require good analytical abilities, which include the use and interpretation of statistics, are some of the most interesting and high paying jobs in psychology—or any field for that matter. Keep that in mind as you study this book and the topic of statistics in general!

Okay. Have I made you a believer? Let me tell you one last thing. **Statistics is fun!**

“Yeah, right!” you say. “What kind of goofy guy is writing this book, anyway?” Well, trust someone who hated math when I say that statistics is the same kind of fun that running, basketball, tennis, dancing, playing the guitar or any other kind of demanding activity is.

I have never known a runner who, the first time they went out and tried to run five miles when they had never run before said “Wow! That was fun!” And yet, once they condition themselves, get the basics down (which are usually kind of boring and tedious) they find themselves getting more and more into it—almost becoming addicted.

The same is true with something like basketball. Very few kids throw a ball at the hoop, miss it fifteen, twenty or even a hundred times and just give up. They keep at it for hours until they finally find themselves getting better and better. It is only once they have put a lot of work into it that it really becomes fun.

That is the kind of fun that statistics can be. Sure, not everybody will become an expert at it. Just as not everybody who practices basketball for hours and hours will be able to play like an NBA All Star.

However, if you apply yourself you will find yourself getting better and better. As you begin to grasp the concepts you will start seeing how all of these things work. Eventually, there will come a point when you will say, “Wow! That is pretty cool!” Just don’t expect it to happen over night.

Since I see statistics as being kind of fun and since I believe that many statistics teachers and statisticians take themselves altogether too seriously, don’t be surprised if I take an approach to explaining things in a way that makes me look like I am some kind of statistics cowboy-making my own rules and poking fun at the “professionals”. Sometimes I will use stories from my own past that, while not directly related to statistics, are intended to illustrate a point or explain a concept in a way that will hopefully make it easier to remember.

Finally, it is my goal to introduce you to the many ways that statistics can be used to solve practical, real world problems. Therefore, I will try to use examples and homework problems that deal with topics as varied as evaluating mental health treatment facilities, testing new drugs, evaluating the likelihood of a convicted criminal’s re-offending after parole, hiring the best personnel, evaluating trends in waste (trash) production and more.

Again, don’t expect things to always make sense the first time you read them. Make sure to read each chapter multiple times and make sure you really understand the concepts. This is particularly important since statistics is like a ladder—if you don’t get the early steps, it may be impossible to get the higher steps.

As you work on the homework throughout this book, you can find the answers to selected problems on the Radical Statistician Website located at: www.jimhiggins.net.

Oh, and one last point. I wrote this book so that my students could have an inexpensive yet interesting and informative textbook on the application and interpretation of statistics. I view this book as a work in progress that, hopefully, will improve every year. Therefore, as you read this book, I would very much appreciate hearing from you if you find a concept that is not clearly explained, think of a way to explain something that might make a particular topic easier to grasp or more interesting to learn about, find any errors in calculation or wording, want to suggest specific homework assignments that could help students master and remember the concepts contained throughout this book.

Email your comments to me at higginj@arc.losrios.edu