Chapter 15
Epilogue:
SPSS, Data Analysis and the EZ Research Project

15.1 Computer-Based Analyses of Research Data

It seems appropriate to conclude with a review of what we have learned in this book about the use of the computer – and the SPSS statistical package in particular – in the analysis of data obtained in a research project such as the hypothetical study at EZ Manufacturing. This text has introduced you to an extremely powerful tool and has helped you develop the skills needed to use it in analyzing data.

In the first several chapters, you learned the basics for using the Syntax Code method and the Point-and-Click method in using SPSS for Windows. You learned how to create a data file consisting of scores from on several distinct variables related to a research question. You learned how to edit that file and to obtain a printout of the file. You also learned how to generate simple frequency distributions of the scores on each variable in the file, as well as how to transform existing variables into newly-created variables. We saw that this procedure could be helpful in getting an overall feel for the data, but that drawing meaningful conclusions from this cursory description of the data was next to impossible.

We then proceeded to the statistical analysis of the data so that we could obtain a deeper understanding of the results. We introduced you to the wide range of descriptive and inferential statistics that could be computed using SPSS on our data file. In Chapter 6, you learned how to generate a variety of **descriptive statistics**, such as the mean, median, mode, range, and standard deviation. This number crunching SPSS routine saves the researcher hours of tedious labor that would be required to compute these statistics by hand. It's also much more accurate. These statistics can be very useful in helping the researcher get to know the data by obtaining single numbers that summarize the entire set of scores for each variable. They are also essential in making comparisons between important groups in the study (e.g., comparing mean leadership performance scores of men versus women).

Chapter 7 introduced you to a routine for creating frequency matrices and contingency tables for scores in various combinations of levels of two or more nominal variables (e.g., the number of task oriented male versus female employees). In Chapter 8 you learned various correlational subroutines that are useful in describing direction and degree of relationships between two quantitative variables (e.g., the correlation between Achievement Needs and Task Skills), and in predicting scores on one variable from another variable.

The above statistical analyses took us a long way toward understanding our data and the relationships between variables relevant to our basic research questions. However, in order to determine whether there were real differences among the various groups being studied, we had to rely on several **inferential statistics** that permit such conclusions. In Chapters 9 and 10 we learned how to use the *t*-test procedure to analyze differences between mean scores of groups on the same dependent variable (e.g., Social Skills scores at two levels of a single independent variable (e.g., Gender).

In Chapters 11 and 12, a more sophisticated procedure was introduced (One-way ANOVA) which allowed the researcher to test for significant differences between three or more groups (e.g., mean Leadership Performance scores of masculine sex typed, feminine sex typed, and androgynous employees). We concluded in Chapters 13 and 14 with an extremely powerful procedure (Factorial ANOVA) which permits simultaneous testing for differences between levels of two independent variables (e.g., Gender and Leadership Style) in addition to assessing their interactive, or combined, effects on the dependent variable.

We assume this introduction has given you an appreciation for the value of the computer in helping the investigator answer both simple and complex research questions. The computer not only saves time and effort, but it can enable the researcher to pose and answer questions that would be difficult, if not impossible, to address by eyeballing the data or by hand computations. We believe that the basic skills you have learned in conducting the above analyses on our hypothetical research project will be easily transferable to future projects that you may undertake. Indeed, you should have acquired a better understanding of statistics and research methods from the examples and exercises, and we hope that you will be motivated to apply this knowledge and skill to whatever career you pursue.

This, of course, brings us back to one of the motivating factors for the EZ project in the first place – the mega consulting fee that upper management at EZ Manufacturing is paying you for conducting this study! What are you going to be able to report to them that might be helpful in the development of their affirmative action program? Let's consider some of the conclusions and recommendations that you might make on the basis of your research and data analysis.

15.2 Sex Roles, Leadership Style, and Leader Effectiveness: A Review

Recall from Chapters 4 and 5 that upper management is interested in identifying criteria for making sound decisions about which individuals (especially female employees) to promote to leadership positions. They hired you to conduct a study investigating important variables related to both gender and leadership effectiveness. Your literature review revealed that both sex role stereotypes and leadership style have been related to performance effectiveness in the past, so you measured all these variables in a selected group of men and women at EZ Manufacturing. Further, you obtained

measures on other relevant variables, such as leader social/task skills and work motivation needs. After collecting and analyzing the data in the manner described in the preceding chapters, you must now prepare a report to be presented at the next board meeting.

What do you tell the eager execs that will convince them that you are worth your huge fee? Before you panic, recognize that it will not be possible to report everything you have learned from your study to these busy people. It will not be necessary to present all the minute details of methodology and statistics discussed in this book – the execs are going to assume that your conclusions are warranted by sound methods and analyses. Indeed, this is another argument for the value of the computer: it has done all the work that permits you to present a meaningful summary and make recommendations that the executives can understand and implement.

To be sure, some tables and figures will lend credibility to your conclusions and facilitate your presentation. However, we will not concern ourselves here with this issue, nor will we pretend that what follows is a prototype of such a report. Instead, we will simply review some of the important and interesting findings of this hypothetical study as a way of helping you to integrate the diverse analyses that you conducted in the previous chapters. Before going on, it might be useful for you to glance over your printouts and jot down some of your own conclusions to compare with ours.

First, we learned that sex role stereotyping does exist at EZ Manufacturing. Many male employees view themselves as primarily masculine, and many female employees view themselves as stereotypically feminine. However, you were able to identify a group of male and female employees who are androgynous. They see themselves as possessing attributes that are *both* masculine and feminine. You also discovered that there are consistent differences in leadership style among employees: some are primarily task-oriented, others are relations-oriented, and still others combine task and social skills in their leadership style.

Further, you uncovered the interesting fact that most of the masculine sex typed employees are task oriented, most of the feminine sex typed employees are relations oriented, and most of the androgynous employees combine task and relations orientations in their leadership style. Thus, traditional stereotypes of a task-oriented leadership style in men and a relations-oriented style in women appear to hold primarily for sex typed employees.

While the above results are interesting in themselves (as well as theoretically important from a scientific point of view), the EZ executives are now anxiously awaiting your interpretations and conclusions regarding their planned affirmative action program. The results concerning your measure of leadership performance effectiveness are key here. Indeed, you discovered many worthwhile relationships to report. One important finding is that there were no significant overall differences between men and women in performance effectiveness. Thus, there is no basis for anxiety about promoting women to traditionally male leadership positions. Thus, stereotypes about men and leadership

do not appear to hold at EZ Manufacturing; women appear to be equally as capable as men, and you can recommend that the affirmative action program be implemented without hesitation.

But which women (and men, for that matter) should be promoted? Your results demonstrated that androgynous men and women are more effective than sex typed employees, so this is a good group to target for promotion. Further, you have evidence as to why this relationship holds. Recall that androgynous employees were more likely to exhibit a combination of task and relations strategies than were sex typed individuals. Other analyses revealed that individuals exhibiting the combined leadership style are more effective than are people who are exclusively task or relations oriented.

Thus, the overall pattern of results suggests that the affirmative action program (and promotions for male employees as well) is most likely to be successful by promoting those individuals who are androgynous and/or exhibit a combination leadership style. It is important to emphasize the value of this knowledge: the net effect of this strategy will be to increase the effectiveness, productivity, and profit potential of EZ Manufacturing as a whole by having the best possible people in leadership positions (a conclusion that will be music to the ears of EZ execs). Finally, you might conclude your report by noting some of the interesting results of other variables, such as work motivation needs, that might assist in developing recruitment, hiring, and promotion guidelines within the corporation.

15.3 Caveat and Conclusion

We believe that enough has been said to give you a feel for the kinds of conclusions and recommendations that could result from a study such as the hypothetical one presented in this book. As we have emphasized repeatedly, these data are hypothetical, and your authors can now confess that we constructed them so that they would come out this way.

While the results have not been concocted out of the blue, the real world of research is not so likely to be as neat and clean. The data do correspond with some actual research in the literature, but you should note that there is never a guarantee that this will be the case – many major projects dead end with inconclusive results, a possibility that you should be prepared for and certainly should warn your clients about before agreeing to conduct the study!

Our goal was to construct a data set that would be manageable for leading you through the various procedures introduced in this text and would yield meaningful results that would be fairly easy for you to understand. We hope that we have accomplished this goal. We also hope that in the process you have acquired the skills needed to address research questions like the ones presented by our EZ project, or to obtain empirically-based answers to any other questions which might stem from your own particular

interests. The tools of the computer and SPSS and the skills for using them have been introduced here – it remains for you to take advantage of them!