

## **Statistical Consulting Center Annual Report**

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**May 28 1998**

### **1 INTRODUCTION**

The Statistical Consulting Center (SCC) at Florida State University is a research assistance facility for the students, faculty, and staff at FSU. While clients outside of FSU are sometimes charged a fee, the consulting center is completely free of charge for FSU students, faculty, and staff. We are staffed by one or more experienced graduate students with faculty oversight. Services include, but are not limited to:

- Translating hypotheses into statistical terms
- Designing sampling procedures
- Choosing appropriate statistical methods
- Interpreting computer output
- Phrasing statistical results
- Referrals to other statistical help

The Consulting Center generally does not perform actual analyses. However, clients are free to reschedule further consultation appointments if an initial visit is insufficient.

My appointment hours for summer of 1998 are Tuesday from 2 P.M. to 4 P.M., Wednesday from 10:30 A.M. to 12:30 P.M., and Thursday from 9:30 A.M. to 11:30 A.M. However, if those hours are inconvenient, arrangements can sometimes be made for different hours or another consultant. Appointments are generally made for two hour blocks, but the entire time does not have to be used.

If you are a potential client and believe you may need statistical assistance, we recommend getting assistance at the earliest possible stage of your research. For more on how to make an appointment, Consulting Center policy, and FAQ, call the main office of the FSU Statistics Department at 644-3218 or visit our website at <http://stat.fsu.edu/consult/index.php>. I can be reached at 644-5755 or [laird@stat.fsu.edu](mailto:laird@stat.fsu.edu).

### **2 SUMMARY OF BUSINESS ACTIVITIES**

In the past year, I have seen approximately 65 separate clients in person. Approximately 10 additional clients were handled by phone, email or FAX. Most of our clients, perhaps 85%, were graduate students at FSU working on their thesis or dissertation. About 10% were faculty at FSU. Most of the rest were from outside of FSU, although at least one undergraduate was also assisted. There was also overlap in the above categories, such as FSU faculty members working on a degree from another university. Clients from FSU came from a wide variety of schools/departments including:

- Anthropology
- Biology

- Business
- Education
- Meteorology
- Music
- Nursing
- Oceanography
- Physical Education
- Psychology
- Social Work
- Textiles and Consumer Sciences
- FSU-FAMU College of Engineering

In addition, clients from other FSU organizations, or from outside FSU were assisted, such as:

- Florida Department of Labor
- Florida Department of Environmental Protection
- FSU Varsity Volleyball coach
- FSU library system
- FSU Police Department
- Seminole Boosters

Typically, clients were seen about twice, although this varied by the client's need. Some clients were seen four or five times. One visit clients were not uncommon either.

A number of different services were requested by clients. Many needed help designing a survey or sampling scheme, including issues of reliability, validity, sample size, and power. About half had already collected their data and were more concerned with choice of statistical procedure or interpreting and phrasing statistical results. For some clients, I read their results to see if they were accurate and clear. One client had no data at all, but instead had questions about distribution theory.

Clients also had a wide variety of statistical backgrounds. Some clients were unfamiliar with even basic terminology used in statistics. Others had knowledge of specific statistical models that required me to learn additional background information to fully understand the client's research. Most clients had a statistical background somewhere in between those two extremes.

### **3 TWO TYPICAL CASES**

The following cases may be illustrative of the kind of work done in the SCC. They can be considered somewhat typical, though still noteworthy enough to be mentioned separately.

#### **3.1 CASE ONE**

I received an interesting case from a graduate student in the Physical Education department. He was studying the effect a sports drink (Powerade) on the length of time one could run on a treadmill. He

arranged for 8 men and 8 women to participate in his study. Sample sizes as small as these are common in drink comparisons.

He measured a number of variables, but was mainly interested in whether the subjects could run longer when drinking Powerade than when drinking a placebo. He had to stop measurement, for ethical reasons, upon anyone running for more than 100 minutes. He therefore had a survival analysis situation with censored data. The unusual aspect of his case was that he had the same subject take both treatments on two separate weekends. His experiment was therefore paired. Survival analysis experiments are usually not paired because when the subject reaches his/her failure time for one treatment, he/she is incapable of participating in any further study. For example, in cancer research, when a patient in one treatment group dies, the patient is no longer alive to participate in the study as a member of any other treatment group.

This case required me to go to the library and look up some references on the analysis of paired survival data, which was an unfamiliar topic to me. I ended up finding a journal article recommending the paired Prentice-Wilcoxon statistic in this situation. Unfortunately, I have not yet heard back the results of this test on my client's data, but I feel I have already benefited from the additional statistical knowledge gained.

### **3.2 CASE TWO**

I received an equally satisfying case from a student in the Education department. He was studying the effect of various activities in which college students participate on "wellness." Briefly put, wellness is an abstract concept measuring a person's overall health; physically, mentally, and spiritually. He administered his survey to about 300 students in different universities in the southeastern U.S. He asked students about the number of hours they spent doing various activities such as homework, partying, or sleeping. He also recorded some demographic variables.

The methods used to analyze his data were fairly standard. We used a stepwise regression model. However, the client's knowledge of statistics was rather limited. I explained a number of statistical concepts to him, such as variable interaction, strength of association, and p-values. Over several sessions, he gradually came to understand the concepts quite well. It was this interpersonal aspect of the case that was most rewarding to me. After the regression had been run, we found that people who were the most "well" tended to be people that spent more time in fitness and religious activities, and spent less time alone. These results may seem "obvious", but it is easy to think of several other "obvious" results (such as differences by race) that did not occur.

This case also involved a data quality issue since a few of the students put down more than 168 hours of activities in one week, which is impossible. I believe the client learned some practical lessons about how subjects fill out questionnaires.

#### **4 REFLECTIONS**

I would like to say that I have enjoyed working in the SCC very much this year, and I look forward very much to working with future clients. I need the statistical learning experience of working with ``real'' data not from a textbook, and I enjoy the interaction with clients on both a professional and personal level. I think I've learned a little about everything from ants to education to hurricane damage.

I would also like to thank a number of professors in the FSU statistics department, especially Dr. Duane Meeter, Dr. Pi-erh Lin, Dr. Ian McKeague, and Dr. Xufeng Niu, for assistance with some unusual or difficult cases. Furthermore, I appreciate Dr. Zahn's generosity in loaning me a copy of the Sage Monograph series.