BUS 735: Business Decision Making and Research
In-class Exercise: Logistic Regression

Learning Objectives:

- LO2: Be able to construct and use multiple regression models (including some limited dependent variable models) to construct and test hypotheses considering complex relationships among multiple variables.

- LO6: Be able to use standard computer packages such as SPSS and Excel to conduct the quantitative analyses described in the learning objectives above.

- LO7: Have a sound familiarity of various statistical and quantitative methods in order to be able to approach a business decision problem and be able to select appropriate methods to answer the question.

Directions: When asked "Test the hypothesis.." or "Is there evidence of.." or "Is there statistical significance of.." conduct the appropriate hypothesis test, following these steps (in order):

- Indicate what statistical test / statistical method you are using.

- State the null and alternative hypothesis.

- Report the p-value.

- Conclude whether you reject or fail to reject the null hypothesis.

- State your result in plain English.

The homework assignment uses the job satisfaction data from your textbook. The data consists of 218 Arab and Jewish social services workers in Israel. Participants were asked background information (gender, age, marital status, education, experience, etc) and were given a set of questions to measure their overall satisfaction with their job, as well as their satisfaction specifically regarding their colleagues, supervisors, salary, and promotion. Please read the more detailed description of the data is given in your text on page 354. The goal of this assignment is to learn what factors lead employees to be more likely or less likely with their job.

Suppose as a researcher you are more concerned with whether or not someone is satisfied with their job, rather than the actual, possibly poorly measured, satisfaction score. Create the following new variables in SPSS:

- SATISFACTION_BIN = 1 if Satisfaction $\leq$ 60.

- COLLEAGUE_BIN = 1 if Colleague $\leq$ 35.

- SUPERVISION_BIN = 1 if Supervision $\leq$ 35.

- SALARY_BIN = 1 if Salary $\leq$ 15.

- PROMOTION_BIN = 1 if Promotion $\leq$ 20.

Each of these new variables is equal to 1 when an employee is *not satisfied*, and 0 otherwise. Investigate how the following explanatory variables influence satisfaction:

- Gender

- Age

- Years

- Ethnicity

- MStatus_Rec

- Education_Rec

- WorkLoad

1. Test the hypothesis that there is a relationship between SATISFACTION_BIN and gender.

2. Test the hypothesis that there is a relationship between SATISFACTION_BIN and age.

3. Test the hypothesis that there is a relationship between SATISFACTION_BIN and ethnicity.

4. Test the hypothesis that there is a relationship between SATISFACTION_BIN and workload.

5. Run a logistic regression with SATISFACTION_BIN as the dependent variable with the above list of explanatory variables.

   (a) Is there evidence that any of the explanatory variables influence job satisfaction? If so which ones? Conduct the appropriate hypothesis test for teach explanatory variable.

   (b) Of the individuals who are not satisfied with their jobs, what percentage of them does the logistic regression model correctly predict will not be satisfied with their jobs.

(c) Consider an employee who is male, 30 years old, has 2 years experience, is Jewish, married, and has a an undergraduate education, and has a workload measure equal to 12. What is the probability he will be unsatisfied with his job?

(d) Consider an employee similar to the one part (c). What is the predicted impact of never being married on the probability he will be satisfied with his job?

(e) Consider an employee similar to the one part (c). What is the predicted impact of being female on the probability he will be satisfied with his job?

6. Test the hypothesis that there is a relationship between overall satisfaction (SATISFACTION_BIN) and...

(a) COLLEAGUE_BIN

(b) SUPERVISION_BIN

(c) SALARY_BIN

(d) PROMOTION_BIN