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 R 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: Work in groups of up to four people and answer the following questions. All papers will be collected, but only one member's paper will be randomly selected and graded and all members of the group will receive the same grade.

By signing below, you agree that the following work represents the efforts of everyone in the group, and you are willing to accept as your own grade for the group project the grade earned from this representation of your group's work. Every member must agree to these terms to earn a non-zero grade for this assignment.

Signature Group Member 1	Print Name	Date
Signature Group Member 2	Print Name	Date
Signature Group Member 3	Print Name	Date
Signature Group Member 4	Print Name	Date

Directions: The homework assignment uses data on job satisfaction for 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. The goal of this assignment is to learn what factors lead employees to be more likely or less likely with their job.

The data can be downloaded from one of the following sources:

- http://murraylax.org/datasets/jobsat.RData
  (download then use command `load('jobsat.RData')`)
- http://murraylax.org/datasets/jobsat.csv
  (use command `dat <- read.csv('http://murraylax.org/datasets/jobsat.csv')`)

The variables in the data set that are used in this assignment include:

- `Satisfied`: a binary variable = 1 if person is overall satisfied with their job, 0 otherwise
- `Age`: age of the employee
- `Female`: binary variable = 1 if person is female, 0 otherwise
- `Jewish`: binary variable = 1 if person is Jewish, 0 otherwise
- `WorkLoad`: a numerical measure on a scale of 6-20 of the size of employees workload, where larger numbers indicate a larger workload
- `Married`: A binary variable = 1 if person is married, 0 otherwise (never-married, divorced, or widowed)
- `EduMasters`: A binary variable = 1 if person has a master degree, 0 otherwise
- `Tenure`: Number of years experience at current job

1. Test the hypothesis that there is a relationship between job satisfaction and gender. What percentage of women are satisfied with their job? What percentage of men are satisfied with their job?

2. Test the hypothesis that there is a relationship between job satisfaction and age. Are people who are satisfied with their job on average older or younger than people unsatisfied with their job?

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

4. Test the hypothesis that there is a relationship between job satisfaction and workload. Are people who are satisfied with their job on average have a higher or smaller workload than people unsatisfied with their job?

5. Run a logistic regression predicting job satisfaction using the above 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) What is the marginal effect of age on job satisfaction for an average employee?

   (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 that being married has on the probability he is satisfied with his job?

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