536 Homework 2

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Problem 1: Mental Impairment Data (See Datasets and Code on the course website)

This dataset comes from a study of mental health for a random sample of adult residents of Alachua County, FL. It relates mental impairment to life events and socioeconomic status (SES). The outcome (mental impairment) is an ordinal variable with four levels: well, mild, moderate and impaired. Life events is a count variable indicating the number of important live events (e.g., new job, divorce, death in family) that occurred to the subject within the last three years. SES is a binary variable with 1 = high and 0 = low.

PART A. Disregard the natural ordering of mental impairment levels and fit a multinomial model that involves both independent variables "economic status" and "life events" using the function `multinom`. Perform a likelihood ratio test to determine whether any of these two variables can be deleted from the model. Choose one model and determine the probability of being well, mild, moderate or impaired for John who has a low economic status and had seven important life events.

PART B. Answer the same questions, but this time take into consideration the ordering of the mental impairment levels.

Problem 2: Alligator Food Choice Data (See Datasets and Code on the course website)

This dataset comes from a study of factors influencing the primary food choice of alligators. The study comprised 219 alligators captured in four Florida lakes. There are five categories of food choices: fish, invertebrate, reptile, bird and other. The alligators were classified according to L = lake of capture (Hancock, Oklawaha, Trafford, George), G = gender (male, female), and S = size ($\leq$ 2.3 meters, $>$ 2.3 meters long). Discuss which factors seem to influence alligators' food choice by fitting appropriate multinomial models. According to your model, what is the probability that a male alligator from Lake Trafford that is 3 meters long prefers reptiles for dinner?