

# Practice Exam

## 694R: Advanced Choice Modeling

4/6/2021

This is your practice exam. The final will have a similar format, but with a different data set. All resources are available to you, including notes, the course textbook, the internet, and your classmates. Your final exam will be the same, *except* you must complete the final exam independently. As a result, I encourage you to work as independently as possible, offering help but not seeking it unless you are entirely stuck.

The `mlogit` library for R includes a dataset called `Car`, which represents the car purchased by a person from a set of options.

```
# load Car object into workspace
data(Car, package = "mlogit")
# show first ten rows of data
Car %>% as_tibble()
```

```
## # A tibble: 4,654 x 70
##   choice college hsg2 com15 type1 type2 type3 type4 type5 type6 fuel1 fuel2
##   <fct>    <dbl> <dbl> <dbl> <fct> <fct> <fct> <fct> <fct> <fct> <fct> <fct>
## 1 choic~      0     0     0 van  regc~ van  stwa~ van  truck cng  cng
## 2 choic~      1     1     1 regc~ van  regc~ stwa~ regc~ truck meth~ meth~
## 3 choic~      0     1     0 regc~ truck regc~ van  regc~ stwa~ cng  cng
## 4 choic~      0     0     1 regc~ truck regc~ van  regc~ stwa~ meth~ meth~
## 5 choic~      0     1     0 regc~ truck regc~ van  regc~ stwa~ cng  cng
## 6 choic~      0     0     0 truck regc~ truck van  truck stwa~ cng  cng
## 7 choic~      1     1     1 regc~ van  regc~ stwa~ regc~ truck meth~ meth~
## 8 choic~      1     0     1 regc~ van  regc~ stwa~ regc~ truck meth~ meth~
## 9 choic~      0     0     0 spor~ spor~ spor~ regc~ spor~ truck meth~ meth~
## 10 choic~     1     0     0 regc~ truck regc~ van  regc~ stwa~ meth~ meth~
## # ... with 4,644 more rows, and 58 more variables: fuel3 <fct>, fuel4 <fct>,
## # fuel5 <fct>, fuel6 <fct>, price1 <dbl>, price2 <dbl>, price3 <dbl>,
## # price4 <dbl>, price5 <dbl>, price6 <dbl>, range1 <dbl>, range2 <dbl>,
## # range3 <dbl>, range4 <dbl>, range5 <dbl>, range6 <dbl>, acc1 <dbl>,
## # acc2 <dbl>, acc3 <dbl>, acc4 <dbl>, acc5 <dbl>, acc6 <dbl>, speed1 <dbl>,
## # speed2 <dbl>, speed3 <dbl>, speed4 <dbl>, speed5 <dbl>, speed6 <dbl>,
## # pollution1 <dbl>, pollution2 <dbl>, pollution3 <dbl>, pollution4 <dbl>,
## # pollution5 <dbl>, pollution6 <dbl>, size1 <dbl>, size2 <dbl>, size3 <dbl>,
## # size4 <dbl>, size5 <dbl>, size6 <dbl>, space1 <dbl>, space2 <dbl>,
## # space3 <dbl>, space4 <dbl>, space5 <dbl>, space6 <dbl>, cost1 <dbl>,
## # cost2 <dbl>, cost3 <dbl>, cost4 <dbl>, cost5 <dbl>, cost6 <dbl>,
## # station1 <dbl>, station2 <dbl>, station3 <dbl>, station4 <dbl>,
## # station5 <dbl>, station6 <dbl>
```

Each of the 4654 individuals in the data has six alternatives. A complete data dictionary is available in the `mlogit` help files by calling `?mlogit::Car`. Transform this dataset as necessary to estimate choice models using the `mlogit()` function.

Identify a preferred model to explain car choice. Consider the following in your identification process:

- Alternative representations of model parameters (e.g., log transforms and divisions).
- Statistical significance and behavioral intuitiveness of the model parameters.
- Comparative relationships between model parameters (e.g., value of time estimate).
- Statistical goodness of fit tests between candidate models.
- Data segmentation
- Nesting structures

Construct your analysis in an Rmarkdown file, paired with appropriate textual discussion. Expose your model code, but print your model results and statistical tests in publication-quality HTML tables. Submit your html file to the assignment on Learning Suite before the deadline, after confirming that you can view the file independently in a web browser.