Ordered Logistic Regression

Examples of ordered logistic regression

- A marketing research firm wants to investigate what factors influence the size of soda (small, medium, large or extra large) that people order at a fast-food chain.
- These factors may include what type of sandwich is ordered (burger or chicken), whether or not fries are also ordered, and age of the consumer.
- While the outcome variable, size of soda, is obviously ordered, the difference between the various sizes is not consistent.
- The difference between small and medium is 10 ounces, between medium and large 8, and between large and extra large 12.

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Examples of ordered logistic regression

- A researcher is interested in what factors influence medaling in Olympic swimming.
- Relevant predictors include at training hours, diet, age, and popularity of swimming in the athlete's home country.
- The researcher believes that the distance between gold and silver is larger than the distance between silver and bronze.

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- A study looks at factors that influence the decision of whether to apply to graduate school.
- College juniors are asked if they are unlikely, somewhat likely, or very likely to apply to graduate school.
- Hence, our outcome variable has three categories. Data on parental educational status, whether the undergraduate institution is public or private, and current GPA is also collected.
- The researchers have reason to believe that the "distances" between these three points are not equal.
- For example, the "distance" between *"unlikely"* and *"somewhat likely"* may be shorter than the distance between *"somewhat likely"* and *"very likely"*.

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Data Set - Graduate School Entry (ologit.csv)

- This hypothetical data set has a three level variable called **apply**, with levels *"unlikely"*, *"somewhat likely"*, and *"very likely"*, coded 1, 2, and 3, respectively, that we will use as our outcome variable.

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Predictors:

- pared , which is a 0/1 variable indicating whether at least one parent has a graduate degree;
- public , which is a 0/1 variable where 1 indicates that the undergraduate institution is public and 0 private,
- gpa , which is the student's grade point average.

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```
             apply pared public  gpa
1     very likely     0      0 3.26
2 somewhat likely     1      0 3.21
3         unlikely     1      1 3.94
4 somewhat likely     0      0 2.81
5 somewhat likely     0      0 2.53
6         unlikely     0      1 2.59
```