

Practice: Using PROC LOGISTIC to Perform a Binary Logistic Regression Analysis

The insurance company wants to characterize the relationship between a vehicle's weight and its safety rating. The **stat1.safety** data set contains the data about vehicle safety.

1. Use PROC LOGISTIC to fit a simple logistic regression model with **Unsafe** as the response variable and **Weight** as the predictor variable. Use the EVENT= option to model the probability of Below Average safety scores. Request profile likelihood confidence limits, an odds ratio plot, and an effect plot. Submit the code and view the results.

```
/*st107s02.sas*/
ods graphics on;
proc logistic data=STAT1.safety plots(only)=(effect oddsratio);
  model Unsafe(event='1')=Weight / clodds=pl;
  title 'LOGISTIC MODEL (1):Unsafe=Weight';
run;
```

Here are the [results](#).

2. Do you reject or fail to reject the null hypothesis that all regression coefficients of the model are 0?

The *p*-value for the Likelihood Ratio test is <.0001, and therefore, the global null hypothesis is rejected.

3. Write the logistic regression equation.

The regression equation is as follows:
 $\text{Logit(Unsafe)} = 3.5422 + (-1.3901) * \text{Weight}$

4. Interpret the odds ratio for **Weight**.

The odds ratio for **Weight** (0.249) says that the odds for being unsafe (having a Below Average safety rating) are 75.1% lower for each thousand-pound increase in weight.

The confidence interval (0.102 , 0.517) does not contain 1, which indicates that the odds ratio is statistically significant.

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